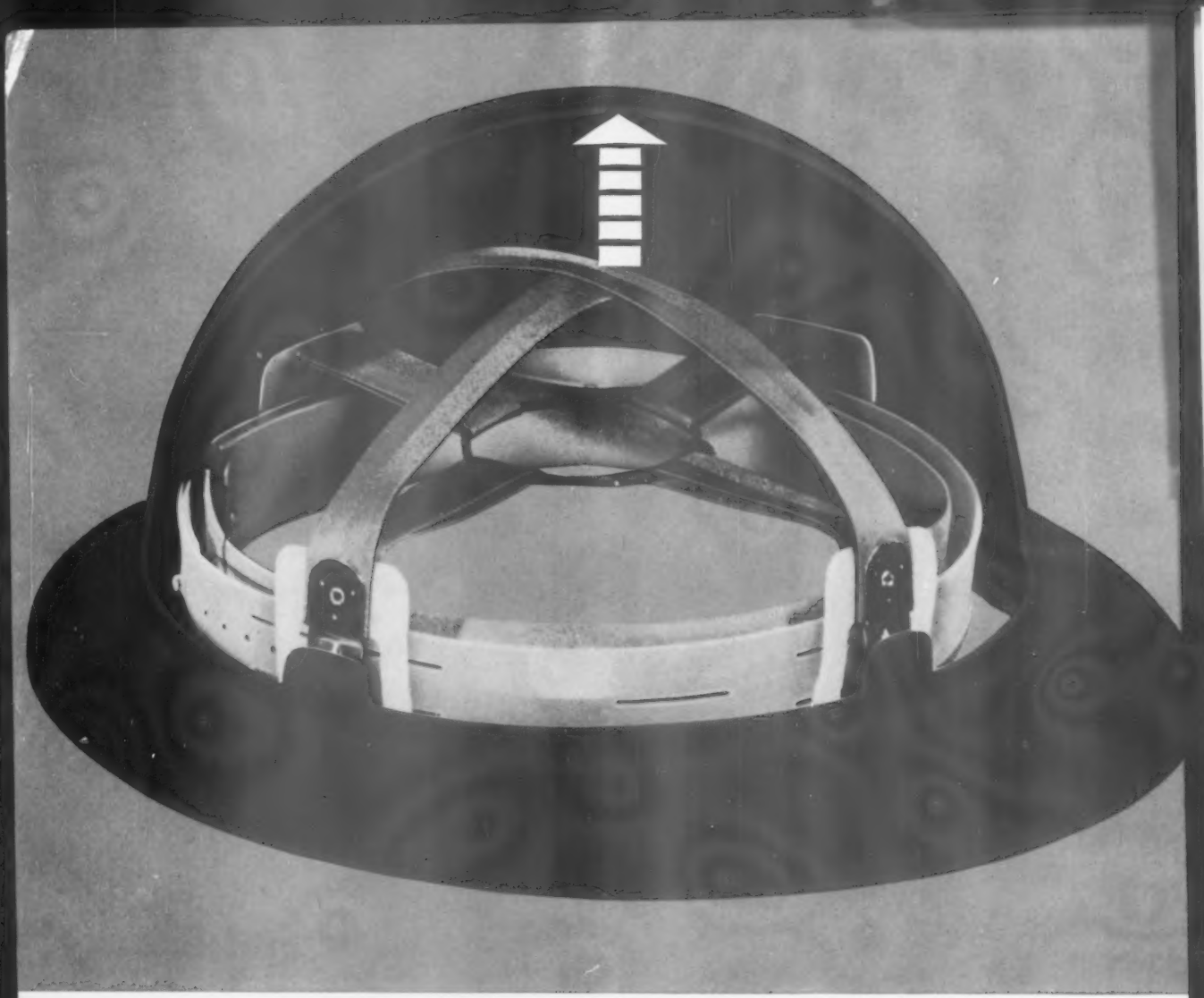
SAFETY NEWS

A NATIONAL SAFETY COUNCIL PUBLICATION

Their Toughest Construction Job



This new suspension meets all Federal Government specifications when used in M-S-A Skullgard Hats.

There's a tamper-proof margin of safety in the new M-S-A® Fixed-Crown Suspension

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National SAFETY NEWS

A NATIONAL SAFETY COUNCIL PUBLICATION

Vol. 78, No. 5 NOVEMBER 1958

EDITORIAL

4 Chain Reactions

FEATURE ARTICLES

12 The Past and the Future (Diary of a Safety Engineer) —*Bill Andrews*
16 Congress Quotes
20 Their Toughest Construction Job—*R. L. Fox*
22 Attitudes and Accidents—*Earle S. Hannaford, Ph.D.*
24 Announce Accident Drop as 46th Congress Opens
26 Perils in a Winter Wonderland
28 A Safety Staff in Action
30 Corrosion of Buried Metal
32 7 Years—11 Awards
34 Breaking Par on the Safety Course
36 Hamburger Without Hazard—*Connor Carroll*
38 They Guard the Danger Spots
42 Pressure-Sealed Locks Guard Atomic Plant
44 Seeing Eyes on the Job
45 Blow Torches and Plumbers' Furnaces—*Data Sheet D-470*

DEPARTMENTS

6 Small Businesses and Associations
8 Wire from Washington
19 News Briefs
31 The Lighter Side
40 Ideas That Worked
52 Consultation Corner
54 Industrial Health
57 Off the Job
58 The Accident Barometer
60 Around the Compass
96 The Safety Library
104 Coming Events
108 For Distinguished Service
127 What's New in Council Services
146 Calendar Contest Winners
149 New Products

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Chartered by the Congress of the United States

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THE COVER

While this welder is at work on the construction of the Shippingport atomic power plant another employee stands by with a fire extinguisher. (Photo by Dravo Corporation)

38,000 copies of this issue were printed

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EDITORIAL

CHAIN REACTIONS

COMPLAINTS about too many meetings are loud and frequent. Looking at our own field, there are few safety men who do not give up several evenings each month to attending meetings of one kind and another, with a few luncheons thrown in. Every community feels it is "overorganized."

Professionally, there are local safety councils, ASSE chapters, safety committees of clubs and associations, regional safety conferences and the National Safety Congress. In the course of a year they add up to a sizable total of man-hours.

And that is just a start. Being a citizen, as well as a safety man, he is called upon to serve on community fund and hospital drives, PTA's, church boards, lodges, and perhaps a few pet causes.

No doubt about it, life would be a lot simpler, if we could cut down on these gatherings. And we all know that a lot of time and energy is wasted when men and women get together to seek solutions for problems. But if they knew the answers, they wouldn't have to spend hours batting ideas around.

One of the prices of civilized living is our dependence on each other. Our decisions, therefore, must often be made in groups. And we have a constant, crying need for knowledge and more knowledge. We can't learn enough from reading, watching, or private conversation.

Civilization also brings an increased feeling of responsibility for the welfare of our fellow men. Through meetings we try to reach many individuals with information and stimulation that will arouse them to action. We must learn, decide, inform, and persuade, and meetings provide a medium.

The most important safety meeting of 1958 is just behind us. The National Safety Congress is not the most important merely because it is the largest in its field. It is significant because it brings together the leaders in all branches of safety work.

The men and women who will give and take information, persuade and be persuaded, and make the decisions at the Congress are those who will be leaders in regional and local conferences, shop meetings in industry, enforcement and engineering conferences, hearings before government agencies, and union meetings. And these same individuals will carry on an incalculable amount of face-to-face work with individuals.

Thus, the National Safety Congress sets in motion a long series of chain reactions, reaching directly or indirectly millions of persons with both information and persuasion.

Because of the Congress, better informed boards of directors may make decisions that prevent hundreds of injuries to employees. Communities may take more effective measures for safeguarding streets and homes. And its lessons may also reach family groups with hints on survival in a high-speed age. Who can tell how far its influence will extend?

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SPERRY INTRODUCES...

New portable radar safety meter for survey of microwave power fields

Like many technical developments, the high-power microwave systems now coming into wide military use present an unexpected problem. Medical and military leaders alike are concerned with the safety of personnel working with these "super radars" which generate tremendous microwave energy fields in their transmitters and antennas.

Current information indicates the surest methods for establishing safe working conditions near powerful microwave devices involve survey measurements of microwave power density in the area. But, until now, application of this principle has been restricted because engineers have lacked suitable portable equipment for making these measurements.

As a leading producer of advanced radar systems, Sperry has devoted extensive research to the problem of assuring safety in their operation. Result of this investigation is the new Microwave Power Density Meter. Weighing only 6 pounds, the meter provides a simple but highly accurate method of exploring the existence of concentrated energy or "hot spots" close by high-power microwave antennas, transmitter tubes and plumbing. It is completely portable and contains its own power supply.

Utilizing the presently accepted safe energy level of 10 mw/cm^2, the Sperry meter quickly registers the relative power density above or below the acceptable level. The meter is scaled to read in mw/cm^2. A single knob operates the meter, permitting its use by nontechnical personnel.

If you'd like more information about the new Sperry Microwave Power Density Meter, write for Microline 646 data sheet.

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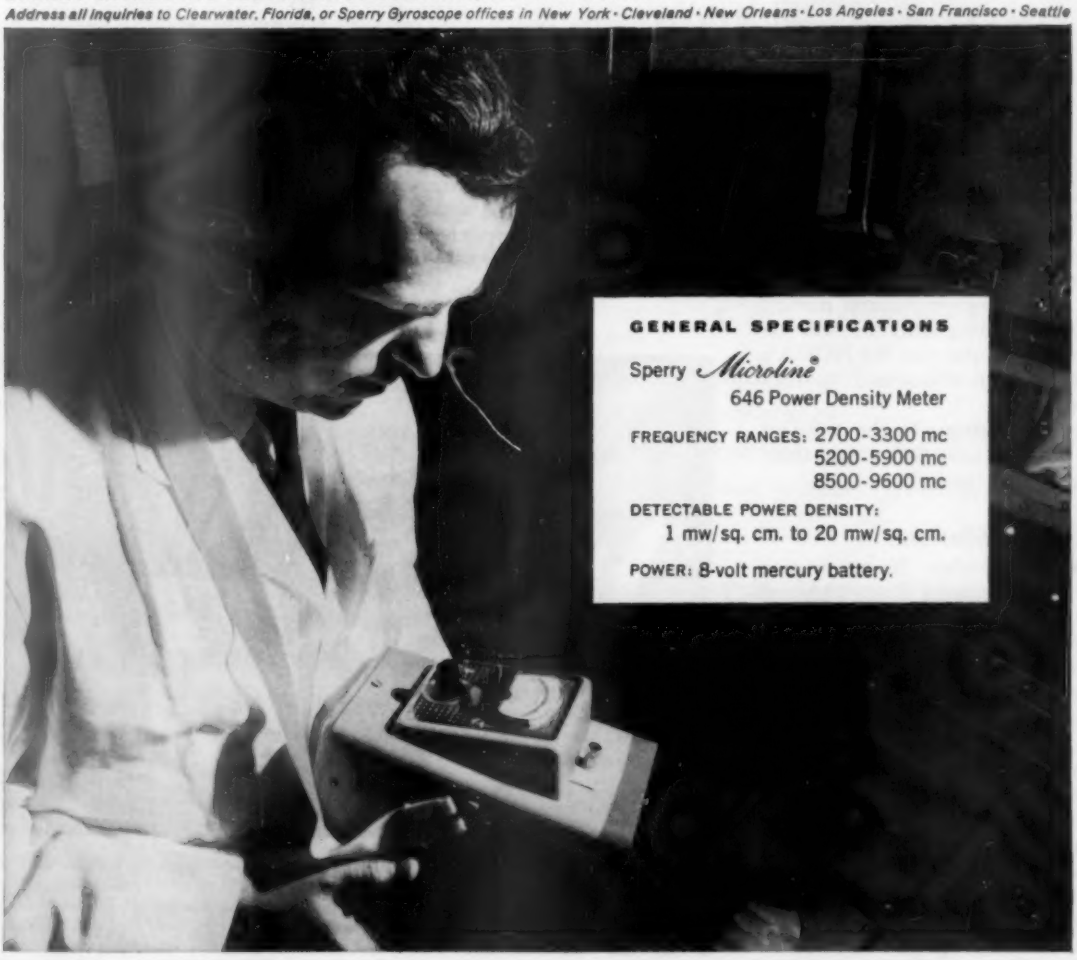

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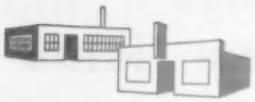
SMALL BUSINESS and ASSOCIATIONS



By A. M. Baltzer and John T. Curry

Small Business Program Staff, National Safety Council

Solid Public Relations

It isn't often a safety award is presented by such a charming young lady, so we couldn't resist using this photo of one of the award plaques of the National

Concrete Masonry Association, Chicago. Three plaques for the best accident-free records during the year ending July 31 will be awarded members at the NCMA's convention in Cleveland in January.

Congratulations to the winners and to the association for their eye-catching award.

A Safety Milestone

The September 30 convention of the Contractors, Plasterers and Lathers International Association in New York probably established a *first* in their panel session on "How to Get the Most from Association Dues."

Four of the five panelists discussed the usual association problems of federal legislation, industrial relations, membership relations, and legal problems; the fifth panelist, John T. Curry, our association consultant, discussed safety.

It is encouraging that Joe M. Baker, Jr., executive secretary of the CPLIA, who arranged this session, recognized the importance of accident prevention as an essential ingredient in association service. Many favorable comments on Mr. Curry's presentation indicate the audience was also pleased that safety was so featured.

AGA Achievement Awards

The American Gas Association, at its 40th annual convention in Atlantic City October 14, presented safety achievement awards to 13 member gas companies.

The AGA also made traffic safety achievement awards to 17 fleets in the National Fleet Safety Contest conducted by the National Safety Council and sponsored by AGA.

Hats off to Rauel Papich, safety consultant of the AGA, and to the safety committees which maintain the successful program of the AGA.

Again, Safety Pays

The *Oil and Gas Journal* reprinted a story from its July 7, 1958, edition regarding the success of the Western Oil and Gas Association's safety program. The cornerstone of the association's program has been a series of regional, annual safety conferences, aimed at operating management, which have achieved remarkable results since the first conference in 1953.

Since then:

Injury frequency dropped 38 per cent.

Injury severity fell 44 per cent.

Accidental deaths were cut almost 70 per cent in five years.

The industry's acceptance of the conferences has doubled the attendance in five years. More than 10,000 men from 110 companies have attended. And 700 foremen have served as speakers or committee chairmen—certainly excellent participation!

S. F. SPENCE (right) of American Cyanamid Co., new General Safety Committee chairman for the Manufacturing Chemists' Association, presents a framed testimonial on behalf of the Committee's members to G. L. Gorbell of Monsanto Chemical Co., retiring chairman. Looking on is J. S. Queener of E. I. du Pont de Nemours & Co., new vice-chairman. The presentation was made during a recent MCA-sponsored chemical industry safety workshop in Houston, Texas.

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WIRE FROM WASHINGTON

By Harry N. Rosenfield
Washington Counsel, National Safety Council

WITH CONGRESS in adjournment, the principal safety focus in Washington has turned to the executive agencies of government.

Industrial Safety. Senate hearings were announced for next year to determine what Congress could do to promote railroad safety. Specifically, consideration would be given to ICC authority to require periodic physical examinations of engineers and firemen.

In a related development, Senator Case (N. J.) said, "no federal agency has responsibility . . . for promoting safety practices on the railroads, except in certain limited areas such as signal systems and brakes," and promised consideration of legislation for federal responsibility over insuring safe railroad equipment and practices.

The ICC issued proposed interpretations of its newly-issued rules and instructions for inspection on testing of other-than-steam locomotives.

The Bureau of Mines finalized its revised regulations concerning procedures for testing and approving multiple-shot blasting units.

The Secretary of Health, Education and Welfare advocated increased federal, state and local expenditures to protect the public from radiation hazards.

The safety aspects of some defense-related activities came in for careful attention. The Army set up a civilian Committee on Safeguards for Army Air Defense Weapons. Its mission is to review the adequacy of safety measures for all Army air defense systems in the United States.

The committee's duties will include review of the safety features of warheads and missiles and of procedures used during the transit and storage of such weapons.

The Atomic Energy Commission revealed some of its hitherto secret activities intended to assure that atomic bombs are not accidentally detonated. The AEC also issued its proposed regulations designed to assure that suitable precautions are taken in the shipment of special nuclear material "to protect against accidental conditions of criticality" which would result in the spread of radioactive material.

Air and water pollution figured on the Washington scene. A National Conference on Air Pollution, sponsored by the Department of Health, Education and Welfare, is to convene November 18-20, with the Public Health Service as host. Experts in medicine, engineering and other scientific professions will review the existing problem with civic leaders and will seek to develop a unified 10-year plan of action, setting up goals and outlining necessary steps to achieve them in research and control activities.

A regional Public Health Service official warned of a likely increase in water pollution during the next decades. This warning came in the same month when federal support of local anti-pollution activities reached the $100-million mark.

The U. S. Department of Labor emphasized that 1958 marks the 50th anniversary of the original federal workmen's compensation law, providing benefits to civilian employees injured at work.

Highway Safety. Congressman Roberts, chairman of the House Subcommittee on Traffic Safety, indicated that during the next session of Congress he would press on H.R. 10,832, which would require every motor vehicle transported in interstate commerce to meet certain safety standards established by the Secretary of

—To page 73

THE MONTH IN WASHINGTON

- **Senate plans hearings on railroad safety to consider ICC authority requiring periodic physical examinations of engineers, firemen.**
- **Secretary of Health, Education and Welfare urges increased federal, state, local funds to protect the public from radiation.**
- **National Conference on Air Pollution to set up 10-year plan of action in research and control activities on air and water pollution.**
- **House Subcommittee on Traffic Safety to seek passage of bill requiring vehicles carried in interstate commerce to meet standards.**
- **Coast Guard schedules public hearings on proposed regulations to implement Federal Boating Act of 1958.**
- **CAA amends technical standard orders to relax its minimum performance standards for fire detectors used in civilian aircraft.**

Circle Item No. 5—Reader Service Card ⟶

Pittsburgh COLOR DYNAMICS® Improves Productive Efficiency in New Blaw-Knox Factory

New painting system relieves eye strain, reduces fatigue and provides greater safety for workers in modern road-paving equipment plant at Mattoon, Illinois.

BLAW-KNOX

THE NEW Blaw-Knox plant at Mattoon, Illinois, is another convincing example of the improvement in productive efficiency, safety and morale resulting from the use of Pittsburgh COLOR DYNAMICS.

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● **The interior** of this entire plant was painted according to the principles of COLOR DYNAMICS. The beneficial effects of this painting system are summarized in this comment by A. J. Cox, general manager of the Blaw-Knox Construction Equipment division:

● **"We selected colors** for interior walls and ceiling to create more cheerful surroundings for our workers. Stationary as well as moving parts of machines were painted in colors that help operators see their jobs better. Eyestrain is relieved. Nervous tension and physical fatigue are reduced. Safety colors mark hazard areas and safeguard workers against dangers of time-loss accidents.

● **"Our experience** since opening the plant confirms our judgment that properly planned colors are a boon to management and workers alike. They are an aid to greater productivity. The pleasant environment enhances morale. Our entire work force takes pride in our plant's appearance. Work areas are kept clean, simplifying housekeeping. The cheerful and pleasing appearance helps us to recruit new employees in an area where skilled labor has been hard to get. And we enjoy all these benefits at no greater cost than conventional painting."

● **This new Blaw-Knox plant** is only one of thousands of factories in which productive efficiency has been improved by the use of COLOR DYNAMICS. Try it in your plant—in a department or on a machine or two—and see the difference it makes.

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ROBERT E. GROSS, ***Chief Executive Officer, Chairman of the Board, Lockheed Aircraft Corporation***

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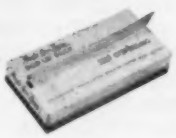

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Circle Item No. 6—Reader Service Card

(Fiction)

Back from the Congress, our Safety Engineer is haunted by the memory of a discouraged veteran who finds that old methods aren't getting results and of the enthusiastic youngster who hasn't yet learned the score

The Past and the Future

By BILL ANDREWS

October 24, 1958

THE OVERSTUFFED FEELING of Congress-end is only partly physiological. It is true that I have eaten too many heavy dinners, have smoked too many cigarettes and talked my throat raw for five days.

But the psychological stuffing is even more pronounced, and my mental digestive system has not yet assimilated the mass of wisdom, information and inspiration that I've been absorbing.

The trouble is one of selectivity. Much of what I've been hearing is of real value and importance to my work. But it is unsorted, uncataloged, unevaluated. I feel rather as if someone had handed me a lot of loose sheets from a top-rank encyclopedia, all jumbled and intermixed. Added to this would be masses of notes from a freshman engineering course, and a random collection of inanities, humor, and platitudes.

I know from experience the methods of sorting out this mental hodgepodge. I keep a convention notebook, and on the train ride home, I'll go over and tear out the pages of notes that seem of least value. As I tear these out, I make a conscious effort tc forget the material covered by those notes. The remaining notes I sort as nearly as I can by topic, and the physical sorting process, I've found, helps to catalog the memories as well as the written notes.

But there's one memory of this Congress which is covered by no note, yet which I cannot forget.

Yesterday afternoon Jake Benteral said he wanted to talk to me, and we sat for an hour in a quiet corner of the hotel lobby. His face has aged markedly since I last saw him in '55. His shoulders are more bent; his hair, like mine, a good deal grayer.

He told me he needed help and advice. His plant's record is getting worse year by year—not dramatically but steadily. He said, "I've been aware of it, and I've been trying to deal with the situation. I have more man-hours of foreman training than ever. Nothing's wrong with the obvious things like guarding. But the kind of workers we get nowadays won't listen to me, and the front office keeps hounding me for results without backing me up with money and putting their influence behind me. I just don't know what's wrong."

I asked him to outline his situation and he did in some detail.

Then I cross-examined him, asking the tough and incisive questions till I had a pretty clear picture. Finally, as gently and sympathetically as I could, I tried to put the obvious facts to him, saying, "Jake, you've outlined a good program—a good program for the year 1948. You know it's a good program for 1948 because you used it in 1948 and got good results. It's right smack out of all the manuals and textbooks of the war and immediate postwar period. But you haven't added one new thing, one adaptation to new conditions and new techniques. Why?"

"What's different about 1958?" He asked.

The question stopped me cold—for the question was its own answer. What can you say to the man who has so completely stopped growing that he has come to believe that the world has stopped changing around him?

I spoke, I am afraid, platitudes. I tried to explain how it seems to me the nature of safety work has changed: the new techniques of education and discussion leadership; the new materials and processes; the undefinable something in the temper of the American people that requires an ever-fresh, ever-changing approach even to old truths. By the time I found myself floundering over such abstractions as "social dynamics," I knew it was time to stop talking.

—To page 68

New cure for the common cold!

No miracles. But this new safety boot *can* keep men on the job through the coldest weather. How? *It keeps feet warm and dry.* It's fully insulated to keep out even *un*common cold weather. It's Quilon®-tanned to keep out water and chemicals. This is an 8-inch safety boot of smart tan leather. It has a leather-lined steel toe box for on-the-job protection. Insole is lined with leather, and cushioned. Storm welt construction. Cushion-crepe wedge sole and heel. Great outdoor safety shoe — cuts down absenteeism. Send coupon for details of this and the complete line of Thom McAn safety shoes, plus *free* set of safety posters.

Style S4137, sizes D 6-13 and EE 6-13

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SAFETY SHOES A Division of Melville Shoe Corporation

Thom McAn Safety Shoe Division, 25 W. 43 St., N.Y. 36

Gentlemen: Please send me the following at once:
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- ☐ Details of Thom McAn's Special In-Plant Fitting Plan
- ☐ Fully illustrated list of Thom McAn Safety Shoes
- ☐ Set of safety posters
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- ☐ Address of nearest Thom McAn Safety Shoe Store

Name_____ Position_____

Firm_____

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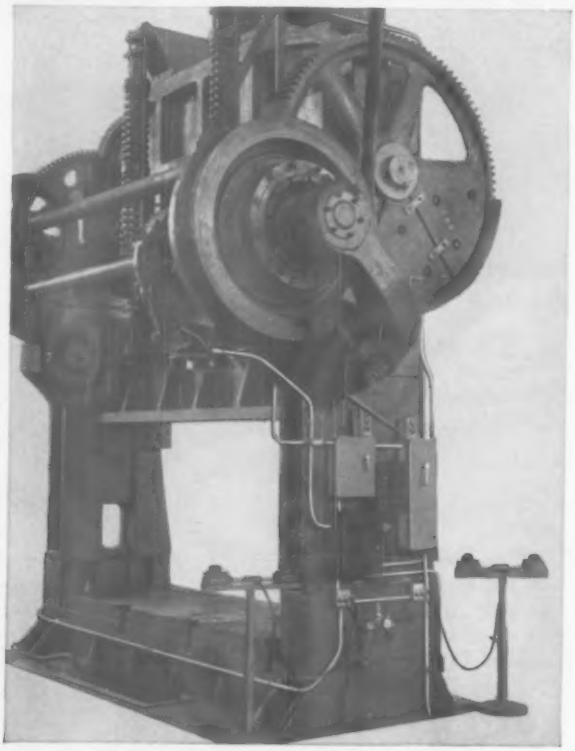
N

Circle Item No. 7—Reader Service Card

MICRO SWITCH Trip Controls



Trip Control 3AA8-2 makes operation of this large friction clutch machine fast, safe, and easy for from one to four or more operators. Adaptable to pneumatic or hydraulic machines.

MICRO SWITCH Trip Controls

increase production while they enforce safety

Step up production!

These modern electrical clutch controls applied to your manually-operated production machines usually increase production by 10% to 15% . . . sometimes 25% or more. How come? One—instant electrical clutch actuation eliminates "lag" between operator action and machine action. Two—fingertip control of precision switches takes minimum energy, helps keep last-hour production up to first hour. Three—operator confidence and uncluttered work area promote a smooth productive work rhythm. In addition, there's a minimum of maintenance, clutch life is extended, and there are no adjustments to be made from die to die.

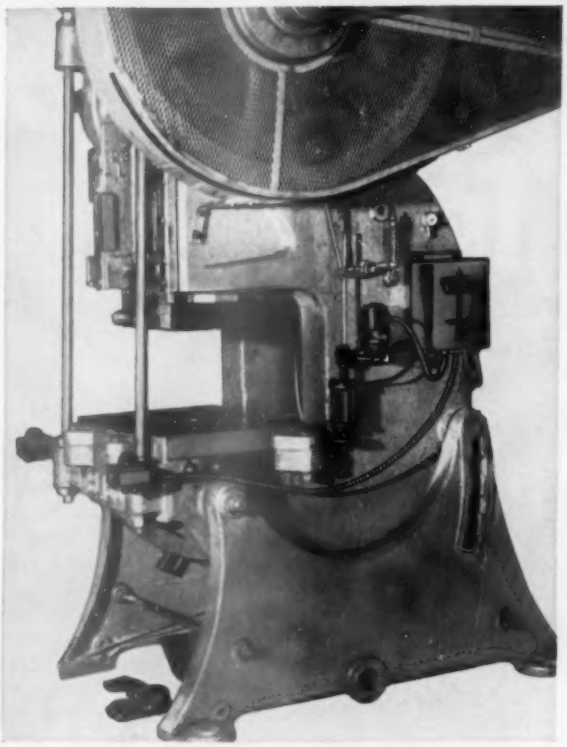
Provide the best in safety!

Three important exclusive features make MICRO SWITCH Trip Controls first in operating safety. One—they can't be cheated, *even for one stroke!* Unless hand switches are properly operated within predetermined and adjustable time interval, the machine does not operate. Re-set is automatic upon release of the hand switches. Two—"Set-up and Run" feature prevents power stroke during set-up and prevents an unexpected power stroke when the motor is started. Three—Trip Controls stay safe . . . prevent operation of the clutch should there be failure or breakage of any control component.

Approved, New York State B. S. A.

MICRO SWITCH TRIP CONTROLS CAN'T BE CHEATED—EVEN FOR ONE STROKE

High Production with Safety



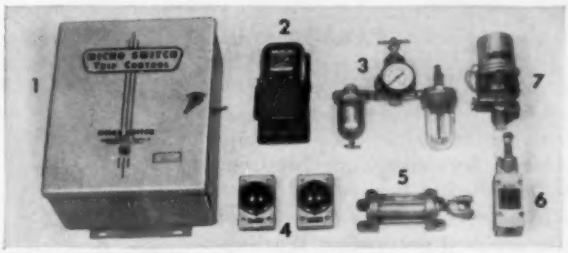
Trip Control 3AA6-2 for one operator on a mechanical clutch press. Permits choice of five different methods of operation for different press jobs, including repeat operation with foot switch. Rotary selector switch is in locked control box.

Trip Control 2AA3-1 on small punch press. Produces single stroke action on any machine. Two hand operation required. Light touch, confidence, and unobstructed vision encourage rhythmic speed with minimum fatigue.

Buy just what you need!

For small, big, huge machines . . . single or multiple operator control . . . mechanical or friction clutch . . . pneumatic or hydraulic drive—there's a MICRO SWITCH Trip Control system that's right for your needs. Distributor stocks include standard controls for most applications.

Original Equipment Manufacturers
MICRO SWITCH will supply complete customized control systems incorporating exclusive Trip Control features. Write Department TC for more information.



Components of Trip Control 3AA6-2 include: (1) control box, (2) foot switch with toe guard, (3) air filter, regulator, and lubricator unit, (4) hand switches, (5) air cylinder, (6) limit switch, (7) solenoid air valve.

MICRO SWITCH . . . FREEPORT, ILLINOIS
A division of Honeywell
In Canada: Honeywell Controls, Ltd.
Toronto 17, Ontario

Let us send you complete information on MICRO SWITCH *Trip Control and name of distributor near you. Ask for Catalog 65.*

Honeywell
MICRO SWITCH PRECISION SWITCHES

Circle Item No. 8—Reader Service Card

Congress Quotes

Views on many topics from the sessions of the 46th National Safety Congress

Constructive Discipline

If we expect to continue to make progress in accident prevention, we must have constructive discipline—discipline that emphasizes the positive.

When the history of our industrial revolution is written, much of the credit for better employee relations will be given to safety. It is the basis for all human cooperation in industry, because it carries a strong appeal so management and workers can be brought closer together.

—*J. E. Morrison, assistant manager of safety and plant protection, Pittsburgh Plate Glass Co. (Glass and Ceramics)*

No Substitute

The safety engineer cannot be supplanted by someone without the proper technical background. Engineering is still the key to industrial accident prevention.

In industry, where the full effect of safety engineering has been felt, the frequency and severity rates of accidents have been cut in half during the past 15 years.

—*Henry B. Duffus, administrator of accident prevention, Westinghouse Electric Corp. (Power Press and Forging)*

Popularity Contests?

Some safety men seem to be more concerned over winning popularity contests than in backing their convictions. Too many of them are afraid to upset the applecart. They lack the courage to fight for the things in which they believe.

They don't want to put other staff members on the spot by pushing too hard for changes in operating methods or for corrections of physical hazards. They go along, hoping nothing will happen.

This may increase the safety director's popularity, but it certainly isn't advancing the cause of safety.

—*E. T. Moore, president, Jersey Central Lines (Railroad)*

When Speed Means Safety

Speed doesn't always kill; sometimes it's beneficial.

The most important part of the treatment of a chemical burn to the eye is what the victim does in the first few seconds. Allow the material to remain in the eye for even a few seconds too long, and some permanent scarring may result.

Get to a source of water and wash the eye thoroughly before the chemical has any more chance to do damage. Best treatment of all—wear safety goggles.

—*D. J. Kilian, M.D., director of industrial health and medicine, Texas Div., Dow Chemical Co. (Chemical)*

Save Your Back!

1. Size up the load. If it seems more than you can handle easily yourself, get help.
2. Face the load squarely, and get a firm footing—feet planted firmly and spread 10-12 in. apart.
3. Bend your knees.
4. Get a good grip on the load.
5. Keep your back straight, and lift by straightening your legs. Lift slowly and evenly.
6. Keep the load close to your body.
7. Don't twist your body. To turn, change your foot position.

—*N. Gillmor Long, M.D., chief surgeon, Lumbermens Mutual Casualty Co. (Public Employee)*

AC vs. DC Underground

Direct current power first was used in underground mines, because it best served the traction needs of electrically powered mine locomotives.

With mechanization, d.c. systems were expanded. As a result, copper costs, power losses and available fault currents increased. Many mine operators looked to the use of alternating current (a.c.) power to minimize the undesirable increases.

The recent trend toward use of three-phase a.c. power underground attests to the advantages offered by a.c. power. While the hazards of shock and electrically initiated fires and explosions still exist whether the electrical power be d.c. or a.c., the three-phase a.c. system lends itself to better control of these hazards.

—*A. C. Lordi, mining industry engineer, Westinghouse Electric Corp. (Coal Mining)*

Every Man a Fireman!

That should be the situation in a chemical plant. It may be necessary to train all of the operating force of a plant in fire fighting.

Fighting chemical fires is a specialized job that requires specialized training. For this reason, the chemical plant should have its own fire forces.

—*Allen L. Cobb, director of fire protection and safety, Eastman Kodak Co. (Chemical)*

Hard Sell for Hard Hats

A forceful selling job and a new company policy helped to gain acceptance for hard hats.

The hard sell came when we tried to get the hats accepted by

—To page 141

BUILT-IN SENTRY GUARDS YOUR HEAD

Power-Bloc suspensions by E. D. Bullard Company

No matter how adjusted, a Bullard **Power-Bloc** suspension always automatically guarantees a safe limit of clearance between the top of your head and the inside of your hat's shell. This lets your safety hat or cap work with shock absorber-like action, blocking power of overhead blows from crushing or lacerating your skull. Your hat is lighter, cooler, and more comfortable with a **Power-Bloc** suspension. Sweatband is made from a remarkable new foam plastic that actually shapes itself to your head as worn. Its highly absorbent characteristic keeps perspiration out of your eyes . . . yet the sweatband can be easily washed new in soap and warm water.

Modernize your "HARD BOILED" hats and caps in seconds

Replace all your old Bullard hat suspensions for the extra comfort and safety of **Power-Bloc** . . . the suspension that makes all others obsolete.

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INDUSTRIAL SAFETY EQUIPMENT

HARD BOILED®

Write or call your distributor for complete specifications

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DON'T GAMBLE WITH HAND PROTECTION!

Keep 'em on the job with gloves that fit the job

No matter what chemical or solvent they're working with, there's a Wil-Gard Glove to fit the job. Seven quality lines . . . over 70 styles provide dependable hand protection in over 200 different industrial chemicals. Wil-Gard gloves are tough and durable . . . scientifically designed to provide extra comfort, maximum finger and hand flexibility.

Before you specify *any* industrial glove, check your Wil-Gard Distributor.

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Sold only through Distributors

FREE! WIL-GARD CATALOG makes it easy to specify the right glove. Charts show lengths, weights and finishes. Write for your copy today!

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THE WILSON RUBBER COMPANY INDUSTRIAL DIVISION CANTON 6, OHIO

A Division of Becton, Dickinson and Company

Circle Item No. 10—Reader Service Card

news briefs

Conductive coon

A racoon that became a pet of several factory employees would have been better off if he had remained in his wild state. He had a burrow near a 6600-volt high-line tower. When he came in contact with one of the conductors near the ground, he was cooked. Some expensive electrical equipment was damaged, too.

Alpha radiation hazard

Some jet aircraft engines use spark gap tubes containing isotopes of uranium. If the spark gap tube is broken, radioactive material could present an alpha radiation hazard to those handling the parts. Personnel handling the parts during or after an accident investigation should be warned.

Scratch two toe caps

Two Allis-Chalmers employees prevented foot and toe injuries by using their steel-toed shoes at home while using rotary power mowers. These are only two of many cases being reported to us.

Value of color

Color is playing an ever-increasing role in industry. Paint and colored building materials are being used generously for the pleasing effect of color, to create a happy working environment, and to achieve a feeling of spaciousness and light. Whatever the endeavor, and no matter how grim it might seem to the uninitiated, industry is going along with the now successfully tried theory that human beings can do their best work in happy, harmonious surroundings.

Weather-warning wireless

A new type of table radio gives a warning when a tornado or severe thunderstorm approaches.

Safe, attractive plastic

A flame-retardant polyethylene will probably be used for such purposes as safety goggle frames and fire extinguisher cones. The recently-developed compound can take a wide range of colors.

Danger tags vital

Canadian industries are being urged by the Industrial Accident Prevention Associations of Toronto to make a flat rule that danger tags and/or lock-out switches be used in every case where men are working in or around machinery, and out of sight of anyone at the control switch. The IAPA cited a case of a man who was crushed while making a minor adjustment on an untagged machine. Their conclusion is that even though this was a minor adjustment, there was nothing minor about the consequences.

Blowing away noise

The Armour Research Foundation has discovered a way to combine soundproofing and ventilation. Forcing air through the holes in acoustical ceilings improves the soundproofing qualities of the ceiling material.

Toxic decomposition products

Because it resists heat and corrosive materials so well, the new plastic Teflon has found wide use in chemical handling equipment and in many high temperature applications. Under some conditions, though, Teflon itself can present a hazard. If small particles of Teflon are heated, the material yields a poisonous decomposition product. Good ventilation is essential where it is machined or sawed. Tobacco should be protected from contamination by the dust. Employees working with Teflon should wash their hands before smoking or eating.

Watch old boilers

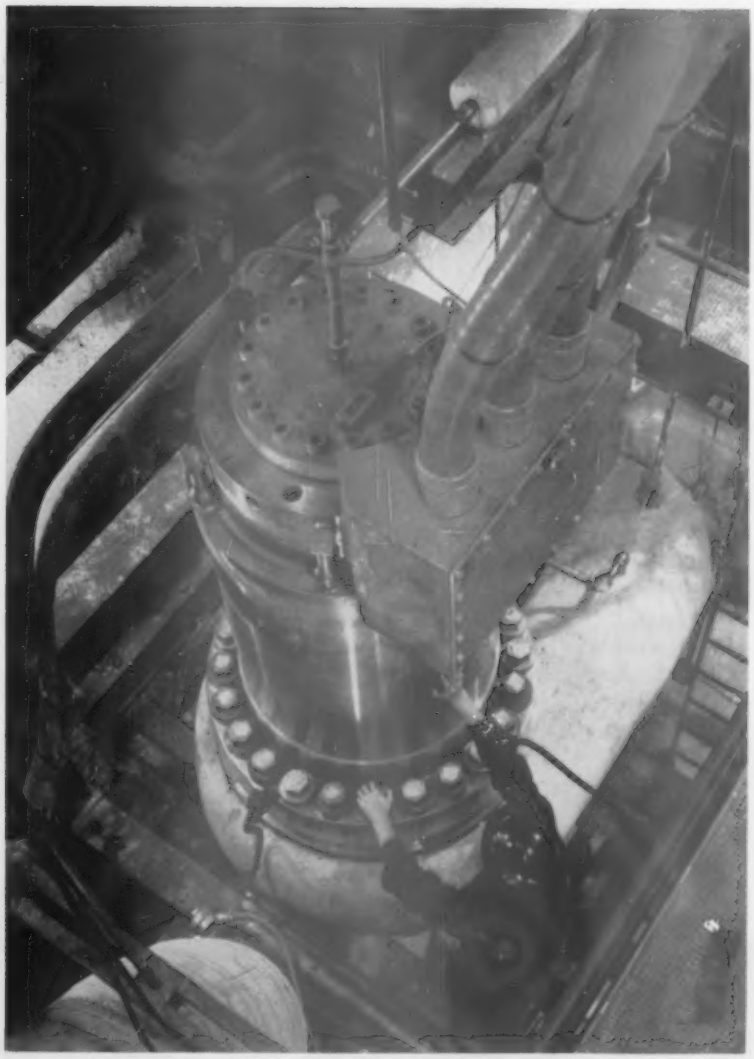
Boilers larger than 36-in. diameter with lap riveted longitudinal joints must be watched very carefully. Serious explosions can be caused by lap cracks in these old boilers. Any leakage at the riveted joints calls for a thorough inspection to make sure there are no cracks at the joint.

Jim Saul

Their Toughest Construction Job

Heavy construction work is never safe or easy but an atomic power plant posed some new problems. Here's how Dravo met them

By R. L. FOX



HEAVY EQUIPMENT, such as this 15-ton 1500 hp. primary coolant pump, had to be lowered through the hatches in the top of the cylindrical chambers at the Shippingport atomic energy plant.

HEAVY CONSTRUCTION poses hazards not found in other fields. When these hazards are compounded by unfamiliar conditions and situations, a higher than average accident rate might be expected.

This could have been the case in the construction of the nation's first full-scale atomic power plant at Shippingport, Pa. A joint venture of the Atomic Energy Commission, Duquesne Light Company and Westinghouse Electric Corporation, this project presented construction problems never before faced on a comparable scale. Each new problem was accompanied by a fresh assortment of hazards.

However, Dravo men, who built the nuclear portion of the plant under contract from Westinghouse, completed 2,005,197 manhours during a two-year period with only eight disabling injuries. Three of these were caused by falls—the highest from a height of two feet. One was caused by flying metal, one by a nail puncture, and the remainder by minor bumps and cuts. A frequency rate of 3.9 and a severity rate of 115 indicate the effectiveness of the program.

Several conditions peculiar to the project had to be overcome by the three Dravo safety men assigned to Shippingport:

1. Confining work areas.
2. Large number of temporary walkways, ladders, and scaffolds, and a corresponding shortage of permanent floors or platforms.
3. Limited means of access for material and equipment.

R. L. Fox is Safety Supervisor, Machinery Division, Dravo Corporation, Pittsburgh, Pa.

4. Large and heavy components, which had to be installed with exacting tolerances.

5. On-the-job use of acetone.

6. X-raying of about 5,000 butt welds.

7. Grinding of about 8,000 stainless steel welds.

8. Less than ideal ventilation.

Although the firm's construction forces moved onto the plant site in December 1955 and began erecting temporary shops, warehouses, offices, and other buildings, permanent construction work was not started until the next spring.

Launching of the program. An accident prevention program was established early during the period of temporary building construction. Half-hour group safety meetings were scheduled to instruct the men in the use of safety equipment, how to operate fire extinguishers, to report all injuries and to acquire safe working habits.

Employment totaled about 150 men at the time, and the meetings were conducted by the project superintendent or safety supervisor. As employment increased to more than 900 men during the next summer, at which time the project went on a two-shift basis, group meetings were replaced by half-hour *craft* meetings. This established a closer contact between each individual and the problems encountered by each.

REBUILDING one of the numerous scaffolds. This one was located against a curved wall in the 50-ft. high auxiliary chamber.

X-RAY TESTING of stainless steel weld. These two men from the Pittsburgh Testing Lab were the only ones allowed in the roped-off area.

A craft supervisor or member of the expanding safety department conducted each meeting. Two safety inspectors, one on each shift, assisted the supervisor in the field. These people cooperated to contact every employee at scheduled safety meetings.

As the nuclear portion of the plant began to take form, it became obvious this was no ordinary construction job. Four under-

—To page 134

ATTITUDES and ACCIDENTS

A prominent safety engineer shows how accident experience is affected by attitudes—of both supervisors and the supervised

By EARLE S. HANNAFORD, Ph.D.

THE accident prone and the accident repeater have received much attention, and fittingly so. However, if we are to prevent injuries, we must also reach those who have never had a mishap, for they are the ones who have the great majority of accidents and are the potential repeaters and mishap-prone. Studies show at least two out of every three industrial accidents occur to people who never had one before.

Industrial safety attitudes are a valid indicator of the accident potential of individuals and of employee groups. Industrial safety attitude scales provide means for determining these attitudes as well as leads for preventive action.

First, we must make sure we all have the same thing in mind when we speak of "attitude." For the purposes of our discussion, let's say—"An attitude is a potential for action." Simply stated, an attitude is an indicator of what a person will tend to do.

Listen to these anonymous statements voluntarily contributed by male employees and male supervisors:

One says, "I work safely, because if I don't, sooner or later I'll be an accident victim." Another says, "Safety rules are OK, unless they cause you too much inconvenience in getting the job done." Which of these two employees would be more likely to have an accident?

Now compare these two: "Safety is mostly talked about and seldom done, so why worry," or "Anyone who talks safety but does not practice it is a hazard to everyone."

It's pretty obvious which employees are more likely to have an accident.

Here's a pair of supervisors' safety attitude statements: Supervisor No. 1 says, "A supervisor who does not enforce safety should be demoted." Supervisor No. 2 says, "Supervisors are hired and trained for production and not for enforcing safety rules."

Now compare these two supervisors: One says, "I would place safety at the top of any list of supervisory responsibilities." The other asserts, "I feel that below-par workmen often use safety as a screen to conceal their own incompetence from their supervisors."

Is there any question as to which supervisor's men would be more likely to have accidents?

Obviously, to find the effectiveness of any indicator of safety attitudes, they must be checked against actual accident experience of the people expressing attitudes.

This has been done in a recent research study, *The Significance of Industrial Safety Attitudes*, in which the readily-assumed relationship between safety attitudes of male employees and male supervisors was correlated with actual accident experience of employees over a five-year period.

The first step was to develop and validate male employee and male supervisor safety attitude scales, since none existed. Participating were about 5,000 male employees and supervisors in 450 industrial organizations selected so as to represent a cross-section of industry.

In addition, organizations were chosen so those with good, fair, and poor safety records were represented. Employee and supervisory safety attitude statements used in developing the scales were voluntary and anonymous. Moreover, they were placed in envelopes by the individual and mailed direct to the researcher.

Safety attitude scales developed from these statements are of the Thurstone type. Employee and

---

DR. EARLE S. HANNAFORD, is Safety Engineer in the Long Lines Department, American Telephone and Telegraph Company. This article was presented at the President's Conference on Occupational Safety, March 26, 1958, in Washington, D. C.

supervisory scales are one-page, 20-item rating instruments of paper and pencil type. They take only 15 minutes to give.

Attitude rating scales were validated by correlating the attitudes of 600 male employees and supervisors with actual disabling injuries of employees over the five-year period, 1948-1952.

Male supervisor scales were validated with supervisors whose employees had had disabling injuries during the same five years. The bi-serial correlation coefficient for the employee scale was .35 and for the supervisor scale .20, and reliabilities were .88 and .83, respectively.

Safety attitude scales were then used to determine relationships between male employee and male supervisor safety attitudes and actual disabling injuries of employees over the five-year period.

Supervisors' Attitudes

Also, the relationship was determined between safety attitudes of male supervisors and disabling injuries sustained by male employees under their supervision. Participating were 769 employees and 481 supervisors from 54 companies with safety records ranging from good to poor.

Employee attitude scales were given to groups of 10 to 20 employees with accident-free records over the five-year period and to corresponding groups of employees with one or more disabling injuries during the five-year period.

Supervisory attitude scales were given to groups of 10 to 20 supervisors whose employees were accident-free and also those whose employees had had one or more disabling injuries.

It was found there was a positive and significant relationship between employee industrial safety attitude and actual accident experience. In other words, the poorer the safety attitude, the greater the number of accidents.

A similar positive significant relationship was found to exist between safety attitudes of the male supervisor and accident experience of employees they supervised.

SOME STUFF

FOLKS really go "way out there" when making excuses for their actions, inactions, weaknesses, or problems.

A guy I know claims his kid has an exceptionally high I.Q.—he said dirty words earlier than his playmates.

Another one fusses about his neighbor—that's where his cockroaches come from.

A rich kleptomaniac isn't really a crook—he can afford to pay for what he steals.

Just mention a situation where someone goofed—and the excuses pile higher than you'd think such stuff could pile.

The comedian pulling his buddy out of an acid tank—"I didn't think a little prod would make him jump like that."

The jay-walker covered with tire tracks—"I didn't have time to go to the corner."

The convert petting his stub—"I did the same thing for 20 years before . . ."

The addict—"I only did it once."

The hiker—"I meant to get gas before leaving town."

The hospital visitor—"I thought Sam was in the clear."

The literary genius' comment on injury report—"He was careless. He shoulda knowed better."

The widow dabbing her eyes as they lower the box—"We only had a couple drinks."

The procrastinator at the investigation—"I thought George was gonna do it."

The shocked father looking at the new triplets—"But, the odds are 1000 to 1."

The sportsman looking through the window in his buddy—"I didn't know it was loaded."

The hot rodder—"But she ran out in front of me."

These are the kinds of common, ordinary, lousy excuses we hear every day. (I thought, I didn't think, didn't have time, did it for 20 years, only once, but, I meant to, I didn't know, careless, the odds were, George do it, etc., etc.)

If you have a problem, make with an original.

—ROBERT D. GIDEL

Expressed statistically, the bi-serial correlation between male employee safety attitude and their accident experience was .32 for employees with one or more disabling injuries, while for employees with two or more disabling injuries, the bi-serial correlation was .43.

Putting it simply and directly, safety attitudes of repeaters are significantly worse than for employees with one injury. In turn, attitudes of those with one injury are significantly worse than attitudes of accident-free male employees.

The same general relationship was found to exist between the safety attitude of male supervisors and accidents experienced by the employees they supervised. That is, the poorer the supervisor's safety attitude, the more accidents their employees had.

Bi-serial correlations for them were .18 where employees had less than .1 disabling injury per employee supervised, and .21

—*To page 62*

Announce Accident Drop As 46th Congress Opens

Delegates hear report of year's activities; elect officers at Annual Council Meeting

THERE WAS heartening news for the audience that filled the Grand Ballroom of Chicago's Conrad Hilton Hotel Monday morning October 20 for the Annual Council Meeting that opened the 46th National Safety Congress and Exposition.

In his report the Council's executive vice-president, General George C. Stewart, announced that accidental deaths in the United States for the first eight months of 1958 showed a decrease of 5 per cent from the total for the same period of 1957. The rate —52.1 per 100,000 population— was the lowest yet recorded.

During the past year, General Stewart announced, the Council has:

1. Studied old and new accident problems.
2. Put out safety information to the public.
3. Made a good start in mobilizing the moral forces of the country for safety, largely through the church activities program.
4. Increased the guidance and help given to local safety programs.
5. Helped other organizations carry on programs.

The Financial Report. Like all business, the Council has felt the business recession, said William H. Lowe, the Council's vice-president for finance, and treasurer, in his annual report. Current prospects are much more encouraging, he said. Looking back over recent years, the Council's record had been one of continued expansion of activities and services to meet the nation's growing needs. He was optimistic about the long range possibilities of effective support through the directors, the trustees and the membership.

Tribute to President Dearborn. Walter F. Carey, chairman of the Council's Board of Directors, announced that President Dearborn had been elected to honorary life membership in recognition of his 16 years of service to the cause of safety.

Mr. Dearborn will continue as president until the first of the year when his successor will be named by the board of directors.

In his address Mr. Dearborn stressed six fundamental needs:

1. An intensive and extensive program of basic research.
2. Fundamental additions to the education program.
3. A complete program of public relations to supplement the present "truly remarkable publicity program."
4. A review of relations with local, regional and state safety organizations.
5. A rededication to the ideal of cooperation.
6. Preaching and practicing the doctrine of moral responsibility.

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LOOKING AHEAD

The 47th National Safety Congress and Exposition will be held October 19-23, 1959. Headquarters will be in the Conrad Hilton Hotel, Chicago, with meetings in other hotels.

In case you're interested, the following additional dates have been reserved for future Congresses:

1960 . . . October 17-21
1961 . . . October 16-20
1962 . . . October 22-26
1963 . . . October 21-25
1964 . . . October 19-23

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Alfred W. Cantwell, National Director Safety Services, The American National Red Cross, Washington, D. C.

Walter F. Carey, president, Automobile Carriers, Inc., Flint, Mich.

Dr. A. L. Chapman, chief, Division of Special Health Services, U. S. Public Health Service, Washington, D. C.

Dr. Zenas R. Clark, administrative assistant, Wilmington Public Schools, Wilmington, Del.

John M. Convery, Employee Relations Div., National Assn. of Manufacturers, New York.

Ernest G. Cox, chief, Section of Motor Carrier Safety, Bureau of Motor Carriers, Interstate Commerce Commission, Washington, D. C.

James Dandelake, president, Miller Electric Co. of Florida, Jacksonville, Fla.

M. R. Darlington, Jr., managing director, Inter-Industry Highway Safety Committee, Washington, D. C.

J. B. Davies, assistant vice president, Industrial Products Group, Mine Safety Appliances Co., Pittsburgh, Pa.

Ned H. Dearborn, president, National Safety Council, Chicago.

E. F. du Pont, director, Employee Relations Dept., E. I. du Pont de Nemours & Co., Wilmington, Del.

Dr. J. Duke Elkow, professor, Dept. of Health and Physical Education, (Men), Brooklyn College, Brooklyn, N. Y.

Wallace Falvey, president, Massachusetts Bonding and Insurance Co., Boston.

C. M. Ferguson, administrator, Federal Extension Service, U. S. Dept. of Agriculture, Washington, D. C.

Charles Ferguson, director, Safety Div., United Mine Workers of America, Washington, D. C.

Charles W. Ferguson, senior editor, *The Reader's Digest*, Pleasantville, N. Y.

R. H. Ferguson, assistant director of industrial relations, Republic Steel Corp., Cleveland, Ohio.

Dr. Lowell B. Fisher, president, North Central Assn. of Colleges and Secondary Schools, University of Illinois, Urbana, Ill.

Kirk Fox, editor emeritus, *Successful Farming*, Meredith Publishing Co., Des Moines, Ia.

THE CONGRESS STORY

Since this issue must go to press during Congress week, coverage is limited to a brief report of the Annual Meeting and a list of the officers elected. Excerpts from Congress papers will be found on page 16. More in December issue.

President Dearborn Honored

For his work in spearheading the continuing national campaign against accidents President Ned H. Dearborn of the National Safety Council was recently awarded the Commonwealth of Pennsylvania's Meritorious Medal. Above, Governor George M. Leader (center) is presenting the medal, with State Senate Majority Leader Roland B. Mahany looking on.

The citation reads:

His dedication to the vital mission of educating the nation's people to the causes of accidents, and how they can be prevented, has justifiably earned him the title—"Mr. Safety."

Mrs. Gertrude H. Frese, assistant to vice president and general manager, New York Telephone Co., Brooklyn, N. Y.

Gerard O. Griffin, director of safety, Dravo Corp., Pittsburgh, Pa.

S. W. Grimes, managing director, Pacific Assn. of Pulp and Paper Manufacturers, Portland, Ore.

Earle S. Hannaford, safety engineer, Long Lines Dept., American Telephone and Telegraph Co., New York.

Mrs. J. Ramsay Harris, Denver, Colo.

J. P. Hightower, director of safety, The Greyhound Corp., Chicago.

Edward F. Holter, lecturer, National Grange, Washington, D. C.

Stanley C. Hope, president, Esso Standard Oil Co., New York.

George A. Jacoby, director of personnel relations, General Motors Corp., Detroit, Mich.

Newell R. Johnson, general manager, American Mutual Insurance Alliance, Chicago.

John F. Juli, safety manager, Consolidated Western Steel Div., United States Steel Corp., Los Angeles.

Walter K. Koch, president, Mountain States Telephone and Telegraph Co., Denver, Calif.

Dalibor W. Kralovec, assistant director in charge of safety, The Board of Public Education, Philadelphia.

Franklin M. Kreml, director, Transportation Center, Northwestern University, Evanston, Ill.

Edmond H. Leavey, president, International Telephone and Telegraph Corp., New York.

Dr. Fred Long, director of health, Dept. of Health, City of Peoria, Peoria, Ill.

William H. Lowe, treasurer, Inland Steel Co., Chicago.

H. G. Mangelsdorf, Standard Oil Co. (N. J.), New York.

Miss Marion E. Martin, Commissioner of Labor and Industry, State of Maine, Augusta, Me.

E. C. McFadden, vice president, Texas Employers' Insurance Assn., Dallas, Tex.

I. W. Millard, chairman of the board, Industrial Gloves Co., Danville, Ill.

D. E. Mumford, director of safety, New York Central System, New York.

Edward C. Myers, vice president—personnel, United States Steel Corp., Pittsburgh, Pa.

Guy L. Noble, Chicago.

Clifton W. Phalen, executive vice president, American Telephone and Telegraph, New York.

A. V. Rohweder, superintendent of safety and welfare, Duluth, Missabe & Iron Range Railway Co., Duluth, Minn.

—To page 98

RESTORING service after sleet storms is hard and dangerous work for public utility crews. Such storms are not confined to the northern states.

Perils in a Winter Wonderland

You can't do much about the climate but it helps a lot to get plant and personnel ready for seasonal changes

WINTER is a wonderland for skiers, skaters, and other outdoor enthusiasts who like the bracing bite of snow and frosty air. But, statistically, the cards seem stacked against industrial safety in the 36 states where annual snowfall reaches up to 80 inches.

These states contain three-quarters of the nation's population and a large part of its industry. A majority of U. S. motor vehicles are operated in these localities. And the 36 states form part of two-thirds of the country in which freezing temperatures exist from two to six months. The result—reduced efficiency, increased accidents, more absenteeism, traffic tie-ups, and interruption of services.

For every degree the mercury drops below zero, an exposed worker loses an estimated two per cent of his efficiency. Casualties from fire, suffocation, and traffic accidents make the headlines. Frostbite and trench foot are among the less spectacular occurrences. And many a worker literally becomes a "fall guy" for treacherous overhanging icicles and slippery walks.

Thanks to the amazing adaptability of human beings and the application of well-known precautions, people are able to live and work in spite of climate.

Fire is considered the most serious winter hazard, increased by the necessity of keeping warm artificially and complicated by the freezing of fire protection apparatus. Also, though water is the most useful and plentiful extinguishing agent available under normal conditions, it obviously is useless for this purpose if frozen.

Suffocation from carbon monoxide gas is another danger made

FIRE HAZARDS multiply in cold weather and the difficulties of fire fighting are increased in proportion. This scene was in full view of NSC offices.

more threatening by man's desire to seek comfort from cold. Unvented gas space heaters or the use of unvented gas appliances as space heaters have proved lethal in generating carbon monoxide in enclosed areas. And carbon clogging of flues in gas-fired space heaters, resulting from incomplete combustion, is another cause for asphyxiation. Motor vehicles, operated indoors, can also produce fatal fumes.

Frostbite occurs when air temperatures dip below 25 F; it freezes the fingers, toes, ears, nose, and cheeks. Trench foot, when inactivity and exposure to wet conditions combine at near-freezing temperature to reduce circulation in the feet, hamstrings many a worker.

Falls—sometimes freak, such as the one taken by the man who died from internal injuries after falling on a corner of his lunch box, but usually conventional—account for much of the toll taken by icy surfaces or snow-covered areas.

Pre-Winter Precaution

Adequate precautions are necessary before winter begins. Otherwise, fire equipment can be damaged by a pre-season freeze-up, crippling an entire sprinkler system and leaving plants without automatic protection.

A dry sprinkler system can usually be used effectively where sprinkler pipes are subjected to freezing temperatures. Dry-pipe-system air pressure should be checked frequently because the accidental tripping of a dry-pipe valve can result in serious freeze-ups. This type of system must be looked at carefully to make sure the piping pitches to drain; low points should be drained periodically to remove condensate.

Protection in the form of a sprinkler system may involve gravity tanks, fire pumps, and underground mains. Any leaking sprinkler tank should be repaired promptly, since accumulation of ice on the tank or any part of the structure is exceedingly dangerous and may result in its collapse. The expansion joint, riser boxing, and tank heater should be carefully examined and placed in good condition.

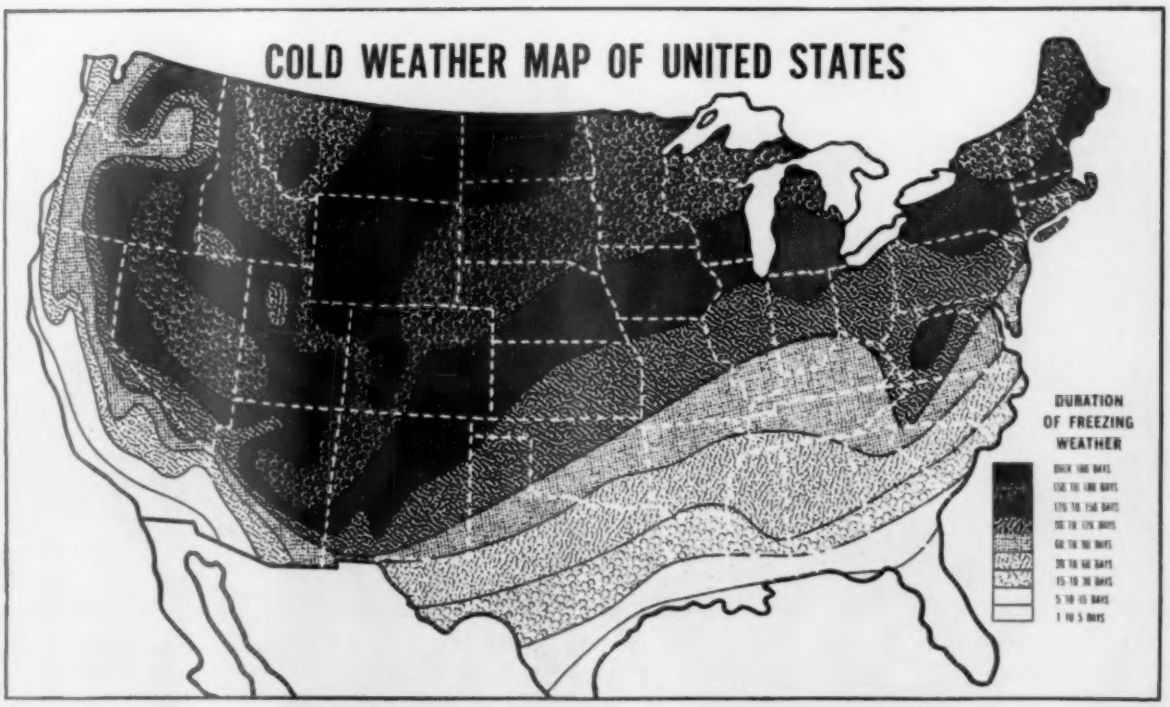
Temperatures above 40 F should be maintained at all times in buildings equipped with wet-pipe automatic sprinkler systems. Temperatures of water in the tank must be observed frequently during the winter. Freeze-up of a tank or its riser impairs fire protection and is costly to repair under difficult conditions.

Test fire pumps regularly. There should always be a competent worker on hand to operate the pump. Fire pump suction pipes can freeze, if inadequately covered. Keep suction cribs, gates, and screens clear of obstructions such as ice, leaves, and other debris. Underground lines should be buried below the frostline. Condition of the intake should be inspected often.

Attention must be given to manually-operated extinguishing equipment, such as portable fire extinguishers, standpipes and fire hose. Extinguishers containing water (including soda and acid) can freeze; those in unheated buildings should be kept in safely arranged heated cabinets. Water in pails, casks, or other containers can be protected from freezing by adding calcium chloride. Carbon tetrachloride and carbon dioxide extinguishers will not freeze. There are other special non-freezing types of extinguishers.

A complete check of the plant's heating system is mandatory. Correct any deficiencies. Clearances

—*To page 116*



A SAFETY STAFF IN ACTION

SAFETY INDOCTRINATION gets new employees at Diamond Alkali off to a good start. Visual aids are used and protective equipment demonstrated.

Constant inspection and instruction promote safer working conditions and work practices

PAPER WORK is important in the safety program. Secretary Shirley Kish types and tabulates volumes of statistics, reports and departmental correspondence.

ON-THE-JOB SAFETY must become a way of life, says Jim Advey, safety supervisor for Diamond Alkali Company at Painesville, Ohio.

"Then," says Advey, "safety at home, on the highway and everywhere else will become second nature."

Bolstering this on-the-job philosophy keeps the safety department busy day after day with

REVIEWING ACCIDENTS to prevent recurrences are Pete Daunch, General Safety Committee (left) and John Fedak, assistant safety supervisor.

TEAMWORK with General Safety Committee. Chairman Merve Sweeney (left) reviews a committee with Jim Advey.

SAFETY discussions include (l. to r.) Plant Physician Dr. J. M. York, Industrial Hygienists Al Rosso and Al Gregoric, and Safety Director Jim Advey.

MULTIPLE LOCKOUT of electrical switches is one of many precautions.

countless details—from inspecting plant equipment to compiling and tabulating safety data.

Safety instruction begins the day an individual starts on the job. Indoctrination classes and person-to-person instruction get him off to a good start, and he is provided with safety glasses and other protective equipment needed for his job. Then follow-up instruction is given in the various departments.

Safety information is disseminated and problems discussed in regular monthly meetings, more than 500 of which were held last year. To promote still greater awareness of safety and safer working conditions, a general safety committee, representing both management and union, gets together in monthly meetings. Four teams of this committee maintain a continuous plant-wide inspection program.

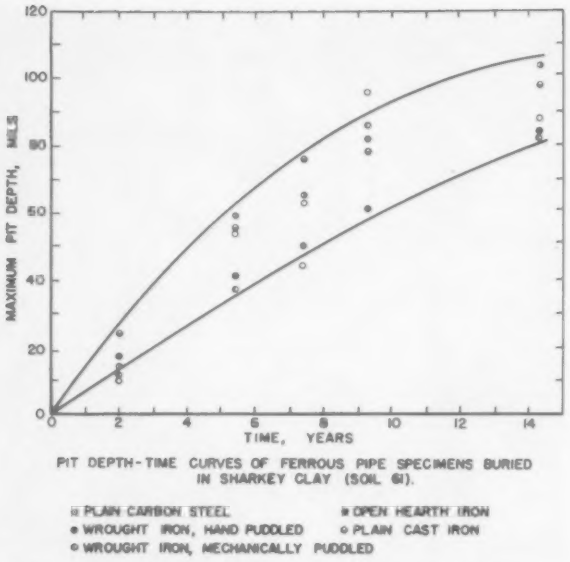
Evidence of the effectiveness of this all-around program and the cooperation of employees is found in the gallery of safety trophies, certificates, and citations, more than 25 of which have been won since 1928.

Further evidence of the value of safety work is found in the huge panel of "Wise Owl" portraits—employees who have saved the sight of one or both eyes by wearing eye protection.

PRE-WELDING CHECK. Al Gregoric and Al Rosso work with the safety department to insure safe conditions.

STARTING RIGHT. A new employee selects a pair of safety goggles from a wide variety of types.

CORROSION TEST specimens being buried in Hagerstown loam at Loch Raven, Md., one of the 125 sites throughout the country used by the National Bureau of Standards in field studies of underground corrosion.



PIT DEPTH-TIME CURVES OF FERROUS PIPE SPECIMENS BURIED IN SHARKEY CLAY (SOIL 6I).

MAXIMUM DEPTH of corrosion pits formed in ferrous pipe specimens plotted against duration of exposure for specimens buried in Sharkey clay. If curves for each material were drawn in, they would cross and recross each other while remaining between the two extreme curves shown. This indicates that no one material was superior to the others; all corrode at about the same rate in the same soil.

Corrosion of Buried Metal

A summary of 45 years of research by the National Bureau of Standards

RESEARCH on the corrosion of underground structures carried on by the National Bureau of Standards for more than 45 years has resulted in a better understanding of corrosion causes. More effective means of protection have been developed through the research.

An important phase of the work, now essentially complete, has been the field burial program to determine the behavior of metals and coating materials exposed for periods up to 17 years in a wide range of soil environments.

Other phases of the program have brought important information on the electrical and chemical aspects of the corrosion process, development of methods and instruments for measuring soil characteristics, improvements in cathodic protection and virtual elimination of corrosion due to stray-current electrolysis.

There are now in this country about 1,000,000 miles of gas, water, and oil pipelines, 170,000 miles of buried power and communication cables, and an unknown number of tanks, pilings, burial vaults, and other structures.

For protective measures and replacements due directly to corrosion, the annual cost to the U. S. pipeline industry alone is estimated at $600 million. A still higher indirect cost results from loss of products, service shutdowns, and loss of life and property by explosion and fire due to leakage from corroded pipes. Since corrosion rates are often unknown, engineers have wasted large quantities of material by specifying too-thick pipes.

Until about 35 years ago, underground corrosion was attributed solely to stray electric currents from external sources, such as d.c. powerlines and electric railways. Such currents pass through parts of underground structures and then discharge to the earth where conditions are favorable; corrosion occurs at the discharge areas.

Seriousness of the problem was recognized by the Congress in 1910, when the Bureau was authorized to investigate the corrosive effects of stray currents. In 10 years of field and laboratory

studies, methods were developed that eliminated stray-current electrolysis as a major factor in underground corrosion.

In 1922, a field burial program was initiated to determine the influence of various properties of soils on the corrosion of buried metals. Data were obtained on nearly 37,000 specimens representing 330 varieties of materials. These were exposed for periods up to 17 years in 95 different types of soil at 128 test sites. The last specimens were removed in 1952, and several more years were required to analyze the data. Present work is confined to newly developed materials and the completion of several studies.

By-products of the investigation include a widely-adopted inspection code for pipes and coatings, and development of methods and instruments for measuring electrical resistivity of soils in the field. These instruments include the McCollum earth current meter, the Wenner four-terminal method, the Megger, and the Shepard canes.

Causes of Corrosion

Most underground corrosion is the result of electrochemical reactions. For such reaction there must be a potential difference between two points of the metal in contact with an electrolyte. Current flows from the anode area through the electrolyte to the cathode and returns through the metal to complete the circuit. The anode area corrodes through loss of metal ions to the electrolyte.

Correlation of this theory with actual corrosion is complicated because of the many factors that determine not only the amount or rate of corrosion, but also whether it is uniformly distributed over the metal surface or is localized as the pitting type of corrosion. The pitting type is especially damaging in pipelines and other structures that store or carry fluids; but for load-bearing structures, such as piles, the main concern is with over-all loss in weight or strength.

Chief contributing factors are presence of moisture, oxygen, and soluble salts in the soil, and permeability of the soil to these substances. Moisture provides the soil electrolyte, composed of hydrogen and hydroxyl ions from the water, and a variety of ions from salts dissolved from the soil. These ions determine the electrical resistivity, as well as the chemical properties of the soil.

Oxygen from the air or from oxidizing compounds in the soil stimulates corrosion by combining with metal ions. If corrosion products are soluble or otherwise removed from the anodic areas, corrosion proceeds; if they accumulate, they may protect the metal against further corrosion or, if they are more cathodic than the bare metal, they will accelerate and localize the corrosion.

Other factors determining the amount of current that flows from metal to soil are the size, number, and location of anodic areas. Galvanic corrosion may result because of contact between dissimilar metals, and because of local differences in the packing of the soil which may produce oxygen concentration cells. Regions with less oxygen are anodic with respect to those with more.

Bacteria must also be considered, particularly the anaerobic sulfate-reducing bacteria that convert soluble sulfates to sulfides. These are most active in poorly aerated swamp areas where the pH of the soil water is about neutral and there is enough organic matter and soluble sulfates for the organisms to thrive.

Soils and Burial Procedures

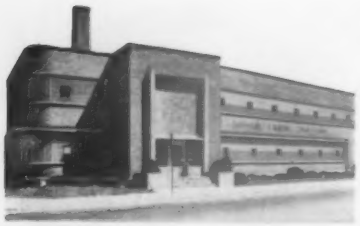
The 95 soil types used in the field program show wide differences in physical and chemical properties. In texture, the soils vary from soft, spongy peats through soft clays, loams, and silts to coarse-grained sands and gravels. The resistivity ranges from 51 ohm-cm, approximately that of sea water, to a value over 1,000 times larger, indicating the absence of soluble salts. Chemically, the soils range from extreme acidity (pH—2.6) to high alkalinity (pH—10.2), and from highly oxidizing to definitely reducing. In addition, there are striking differences in the kinds and amounts of soluble salts present.

the LIGHTER SIDE
NATIONAL SAFETY COUNCIL
HEY, MOM, SANTA CLAUS JUST SLIPPED ON THAT ICY WALK. YOU TOLD DAD TO PUT SALT ON!
IT WOULD BE ALL READY IF I HADN'T BUSTED A FINGER!
Don't let an accident spoil your Christmas.
THAT REMINDS ME, ELOISE, HOW ABOUT GOING SKATING TONIGHT?

Plain ferrous metals. Plain ferrous pipe materials represented in the field tests were open-hearth iron and steel, hand-puddled and mechanically-puddled wrought iron, Bessemer steel, plain carbon steel, and pit-cast and centrifugally-cast iron.

Field test results for these metals, as well as those for low-alloy

—To page 131



7 YEARS 11 AWARDS

They're from Milwaukee and the record shows they know how to keep down accident rates

IN THE reception room of the Milwaukee Electric Tool Corporation is an impressive collection of safety trophies—11 all told. They're a source of pride and satisfaction to management and employees and to the insurance carrier.

Several years ago the company decided to rewire its safety activities, step up energy, and keep the operation humming. As a result, for the seven years the program has been in force, this manufacturer of portable electric tools has maintained an annual accident frequency rate of less than half the average frequency for its industry.

One measure of this success is in seven consecutive awards from the corporation's insurance carrier, Employers Mutuals of Wausau. Add to these presentations two National Safety Council top awards — the Award of Honor — one NSC Award of Merit, a Wisconsin Council of Safety Certificate of Honor, and you have a record that speaks with authority.

The firm's approach to safety has been a direct one. The first step seven years ago was to become active in the National Safety Council and the Wisconsin Council of Safety, as well as with local safety organizations. Prior to this, the tool-making company had never been associated with any safety group, local or regional.

Realizing there is no magic in a membership card, the firm set out to take full advantage of available benefits and safety services. It sent key supervisors to weekly training sessions at foremens' and firemens' safety schools sponsored by the Milwaukee Association of Commerce. The safety director attended a civil defense school for light duty rescue instruction, and company personnel joined local safety group activities.

These actions helped set a new tempo in the plant, stimulating new attitudes and enthusiasm for accident-free work.

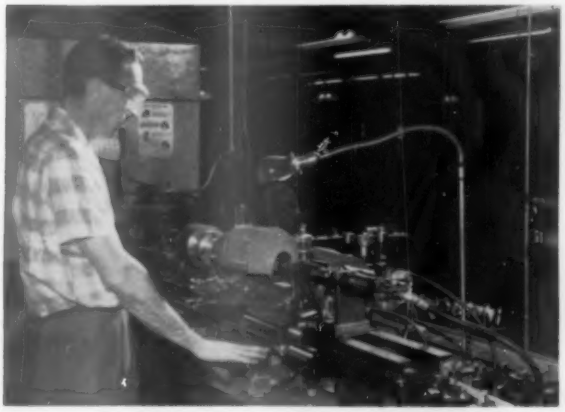
"We have no extreme fire hazards in our plant," reports Safety Director Ray Enos, "but we feel that attendance by our supervisors at foremens' and firemens' safety school promotes a *general* interest in fire and accident prevention. We believe the benefits of training in a specific phase of safety spread far beyond the narrow range of the subject."

A SOURCE of pride to the whole organization is this collection of safety trophies won by employees.

EYE PROTECTION is stressed in eye-catching safety displays like this employee-produced poster.

NO SPARKS can touch this worker as he removes heat-hardened tool parts from the electric furnace.

DOUBLE PROTECTION. A transparent plastic shield at the point of operation and goggles on the operator provide ample eye protection on this high speed lathe used for cutting down motor armature units.



To help maintain interest, the firm carries on continuous safety education through employee publication features, monthly employee letters, payroll inserts, bulletin-board postings, and other safety communications dealing directly with the organization's specific hazards and operations.

Other companies have used these same methods—some to far greater extent; then what explains this plant's safety success? Ray Enos is convinced the caliber of employees is the answer, along with general employee attitude.

Since the company revitalized its accident-prevention efforts, employee turnover has decreased remarkably. The firm still has 75 per cent of the same workers who were with it at the beginning of its safety campaign. Employee and management enthusiasm for the program is high.

To foster better employee relations and teamwork, the corporation has developed a profit-sharing plan. Employees know that as the company prospers, so do they, and are keenly aware that accidents are costly . . . in more ways than one. Workers are constantly motivated by the need to produce—and produce safely—for greater profits.

"If anyone around here spots a potential hazard, he doesn't just shrug it off," Enos explains. "He comes right to me with it and often indicates he's given the problem some pretty shrewd analysis."

Dan Petersen, servicing engineer for the firm's insurance carrier, says, "The most significant part of the whole story is the fact that these people don't even consider safety as a thing locked away by itself in a water-tight compartment; they look on it as a solid part of the overall job of turning out the work, expertly and economically . . . and profitably."

No idea can be more erroneous than that children go to school to learn the rudiments of knowledge only, and not to form character. The character of children is always forming. No place, no companion, is without an influence upon it; and at school it is formed more rapidly than anywhere else. —*Horace Mann.*

No safety meetings, as such, are held in the plant. There are monthly foremen's production meetings, in which current production problems are ironed out, including any hazards in procedure or environment that must be controlled.

This provides an insight into this firm's broad, realistic attitude toward accident prevention:

Eliminate a hazard and you eliminate a production problem;

Weed out unsafe practices and you weed out inefficiency;

Develop a safer method and you develop a better, more productive procedure;

Strive for accident-free performance, and you strive for smooth, economical profitable operations.

How the company has achieved outstanding safety performance boils down mainly to *attitude* and *action.* Seven years ago the corporation began to shape the correct attitude which, once shaped, provided a foundation for consistent action in the direction of safety. The 11 awards in the company's reception room speak eloquently for the rewarding application of these safety principles.

MAINTENANCE work exposes transit employees to street traffic hazards. In addition to flags and signs, a member of the track repair group acts as a flagman to protect the welder.

WEEKLY RITUAL. Late Friday afternoon is extra cleanup time and all employees pitch in and help.

Like the old-time sermon, this safety program had 14 points. Applying them won several awards for St. Louis Public Service

Breaking Par On the Safety Course

A COMPANY qualifying for a National Safety Council Award of Honor must do better than the "pars" based on the company's frequency and severity rates for the previous three years and the average rates for the industry.

St. Louis Public Service Company did that three years in a row—1955, 1956, and 1957. For the 1957 Award, for example, the company had to establish a par of 57 per cent reduction for the frequency rate and 30 per cent for the severity. Public Service Company's record showed decreases of 62 per cent for frequency and 90 per cent for severity.

Public Service has also been a consistent winner in the NSC Transit Section Employee Safety Contest. For the fifth consecutive year the company managed to improve its record, with a 1957 rate of 3.28—lowest rate in the six year history of the division.

One operating division, with 350 bus and streetcar operators, has worked more than 2,000,000 man-hours continuously without a disabling injury.

The story of the St. Louis Public Service Company again illustrates what can be done when top management creates and maintains a sound, organized safety activity.

In 1952, President John C. Baine decided that a formal program should be created to influence the employee's work habits. This is particularly important in city transit operation where the cost of traffic and passenger accidents involving buses and streetcars is many times greater than that of workmen's compensation cases.

Mr. Baine's conviction has proved correct. With the decrease in employee accidents, the company has also experienced substantial reductions in traffic and passenger accidents during the past three years. With approximately 1100 buses and streetcars operating about 30,000,000 miles a year, a reduction of 13.6 per cent

FIGHTING real fires is part of the employees' safety training program.

in the number of traffic and passenger accidents for 1957 over 1956, for instance, reflects a creditable showing in relation to the exposure, particularly in view of the fact that police records showed a 13 per cent increase in accidents involving motorists. Selling safety to the employee has made him safer in dealing with others.

Public liability and property damage, and workmen's compensation insurance is provided by the Transit Casualty Company. In addition, the company provides safety engineering service under the over-all direction of the safety manager, C. R. Sypher.

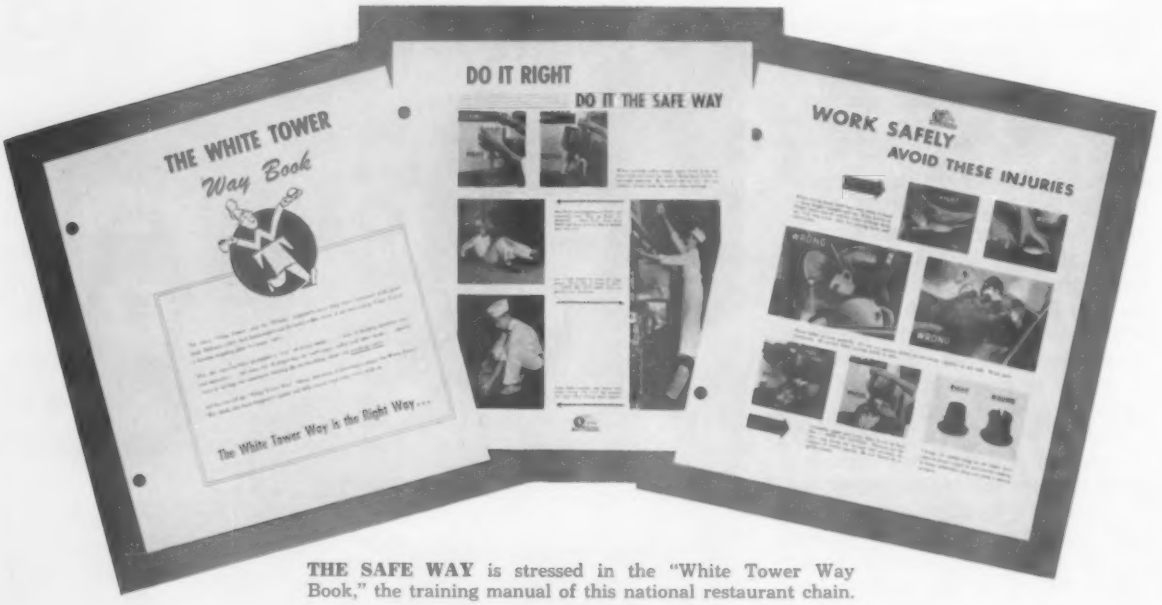
Monthly accident statistics are prepared and distributed by Transit's Safety Engineering Department. Public Service has no one on its staff specifically designated as a "safety man." One secret of the company's success is that it has made safety a part of each job, including officers and department heads.

A "staff safety committee" is the top policy-making group and it is composed of those department heads involved in operations, with the company's operating manager, John W. Dameron, serving as chairman. M. G. Bullock, supervising engineer of Transit's

—To page 121

DEVICE for holding and turning turbine drive unit during repair was developed in the shop to facilitate work and save backs. Each major work area also has a power crane.

WORK AREAS where grinding or welding is done are shielded from other workers in the vicinity.



THE SAFE WAY is stressed in the "White Tower Way Book," the training manual of this national restaurant chain.

Hamburger — *Without Hazard*

Serving good food and protecting patrons and employees against accident are the aims of this restaurant chain

By CONNOR CARROLL

WHITE Tower Management Corporation, a national restaurant chain, several years ago found itself plagued by costly disabling injuries. Cuts, burns, falls, and other mishaps hamstrung the organization's severity and frequency records. An intensive, effective safety program became urgently necessary.

Cooperating with its insurance carrier, The Massachusetts Bonding and Insurance Company, the chain developed a safety campaign tailored for White Tower's numerous, widely-situated eating places.

In 1957 the firm's New York City district served as a guinea-pig area for this safety activity. One result, gratifying to the company, has been the presentation of an Award of Merit plaque to the district by the National Safety Council for reduced frequency and severity rates. And the program, projected nationally by the parent firm, is paying off in lowered disabling injury records throughout the chain.

CONNOR CARROLL is with the Engineering Department, Massachusetts Bonding and Insurance Company, Boston, Mass.

A Long-Term Plan

Basically a long-term plan for multiple-location, varied-territory operation, this safety effort depends on certain primary elements:

1. Pinpointed preliminary instruction for employees.
2. Rigid, frequent inspections by supervisors and insurance carrier representatives.
3. Consistent executive attention to known accident hazards.
4. Streamlined administrative and educational materials.
5. Detailed maintenance procedures.

The activity first gathered headway in December 1956 following a decision by Thomas Saxe, Arnold Saxe, and Howard Gleason —top White Tower management team—to conduct a concentrated safety campaign in the New York City district. This includes Manhattan, Northern New Jersey, Queens, the Bronx, Long Island, and Westchester County.

White Tower executives met with Peter Mancini (New York City district manager), the entire supervisory group in the area, maintenance department members, and a representative of the company's insurance carrier. Recommendations from these conferences have been molded chiefly around the key role of the supervisor in his inspection and follow-through on safety among individual Towers.

The meetings involved presentations based on frequency and severity statistics culled from the firm's records for more than three decades; these graphically showed causes for many accidents, potential and past.

The Chris. Schroeder & Son Agency (Milwaukee), handling the White Tower insurance account, made specific suggestions for the company's promotion of safety. Training materials received attention.

Suggestions at Work

Most of these suggestions are presently a part of the White Tower worker's life from the time he or she interviews with the personnel department, through the training period, to the employee's role as a "towerman" or "towerette."

Personnel now use a new type of bun-slicing knife. Safety collars have been installed to prevent coffee bowls from tipping. Renewed stress underlines company regulations requiring adequate first-aid equipment in each Tower. Information is available in every Tower regarding the emergency location of doctors and hospitals. Specially-slanted forms, record charts, published messages, and gimmick safety reminders give added impact to White Tower's effort.

A newly-devised *Supervisor's Accident Reporting Form*, designed for inclusion in a loose-leaf notebook, adds teeth to the program, administratively. All Tower workers must indicate each accident to their supervisor. He, in turn, is obligated to file one of these forms, describing the mishap in detail, with his city or district manager.

Training Aids

All accident reports must go from White Tower city managers to the firm's insurance department at Stamford, Conn. When this department receives a late or incomplete form, it sends a colored slip to the city manager from whose office the information originated. The slip requests additional data or reasons for tardy submission of the report.

Another effective safety aid is a wall chart, placed in the supervisor's meeting-and-report-writing room and listing the breakdown of White Tower districts. Should an employee accident occur, a red star is posted in the *month* column across from the Tower location involved.

A poster-calendar has served prominently as a visual safety help. After daily inspections each supervisor marks the calendar with an *OK* for the preceding day; if an injury has occurred (including customer mishaps), he marks a large *X* over that date. These *Hurt of the Month* posters come from the White Tower art department and show typical Tower hazards as illustrations.

National Safety Council *Safe Worker* booklets, supervisors' pamphlets, and appropriate Council posters receive wide distribution in White Tower branches. The chain's house organ, *Field Flash*, publishes material on potential hazards. NSC seasonal publications, stressing off-the-job accident prevention, are sent to Tower personnel at business and home addresses.

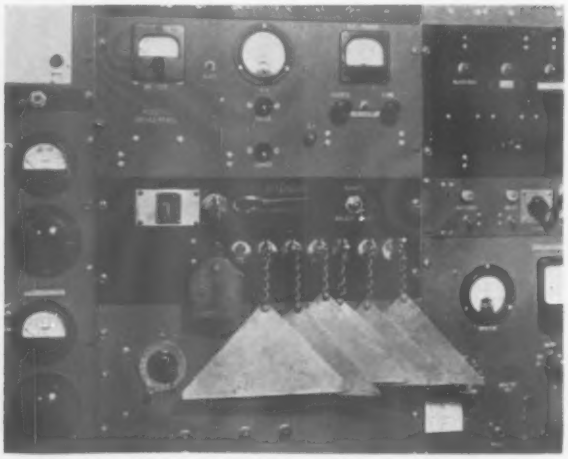
Supervisors' meetings include discussions on accident prevention and often refer to a wallboard "dog house." Each supervisor is represented by a dog cutout with his name imprinted. Should an accident take place, the cutout of the supervisor in whose district the injury occurred is hung on a hook in the "dog house" entrance.

EACH MONTH'S calendar leaf features the "Hurt of the Month," with sketches and brief instructions on how to avoid it.

They Guard The Danger Spots

Originally developed for the electric power industry for high-voltage equipment, key interlock systems are now solving safety and control problems throughout industry

BEFORE entering bunker area of Stanford University's billion electron-volt linear accelerator, scientist must obtain key from accelerator control panel. As long as he has key, no one can start accelerator.



INTERLOCK system automatically protects personnel from radiation at linear accelerator. As long as one key is missing, control circuit is broken; accelerator can't start.

STANFORD University's giant Mark III linear electron accelerator presents two hazards to the nuclear scientists who work with it—radiation and high-voltage d.c. circuits.

Anyone entering the *bunker* area, while the one-billion electron-volt accelerator is running, would be exposed to dangerous radiation. Similarly, anyone entering the high-voltage equipment cage, while power is turned on, would be exposed to high-voltage current.

Key interlock systems solve the problems. These systems prevent personnel from entering either area while a hazard exists and also prevent either area from being activated while occupied.

Sequence by Interlock. A key interlock system insures operations are carried out in proper sequence by preventing or allowing movement of one part only when another part has been locked in a predetermined position.

A simple illustration can be seen in the interlocking of extension ladders on power company repair trucks. If a repairman were to drive a truck away with its ladder extended, he could rip down power lines.

The interlock system makes this impossible. He must remove the key from the truck's ignition to unlock the ladder. This key is then held by the lock and cannot be removed until the ladder is returned and locked in place. Then the operator can start the truck.

This also points out the essential difference between interlocks and the common lock people are most used to. While in the common lock the key can be removed in the locked or unlocked position, the interlock permits removal of the key in one position only—after some act has been performed.

Interlocking the Accelerator. The key interlock system for the accelerator is an extension of the basic principle used on the truck. Here is how the accelerator is interlocked:

On the control panel of the accelerator is an eight-lock interlock, each lock having one key. Each person who wants to enter the accelerator must first take a *radiation* key from the panel. This key permits him to unlock the door to the bunker area.

When any one key is removed from the control panel, the control circuit is broken and the accelerator is locked off. As long as any one of these keys is missing, the circuit will remain broken and the accelerator cannot be started. More than one key is used to permit additional people to enter subsequently. The high-voltage equipment cage is interlocked in much the same way. These interlocking systems were devised and supplied by I-T-E Circuit Breaker Company's R&IE Equipment Division.

Universal Application. Key interlock systems are not limited to

electric power and nuclear installations. These systems are used in steel fabrication, food and chemical processing, petroleum refining, paper mills, rifle test sites, ammunition depots, and countless other areas.

Most industrial operations should be performed in a certain sequence. Key interlock systems —by assuring that this sequence is always followed—are used to protect life, equipment, and products. They prevent the authorized individual from committing the unauthorized act.

The universality of key interlock applications is due to two inherent qualities: they are simple; and they don't get tired or bored and become forgetful or absentminded.

Types of Interlocks. The principle of interlocking is not new, and today many types of interlocks are used—principally mechanical, electrical, and key.

A mechanical interlock consists of a bar, chain, gear, or other mechanical arrangement between the interlocked devices. The interlock is arranged so, when one device is moved, the other is automatically moved into corresponding position.

A mechanical interlock is reliable and, when properly designed, difficult to defeat. Because a direct mechanical connection must be made, it is limited to devices that are close together.

Electrical interlocks solve the problem of distance—although it is sometimes difficult to arrange the wiring of the system—but they become inoperative with a power failure or an electrical failure in the interlock circuit.

Key interlock systems solve the difficulties of each by taking the best features of both. A key interlock system is a mechanical operation and does not depend on electrical power. Yet, the key—the mechanical link between the interlocked devices—is carried from one position to another, so physical location of the devices seldom becomes a problem.

A simple key interlock system may consist of only two interlocking devices operated by a single key. Complex systems may use hundreds of locks, each with its own function. The majority of installations fall inside these two extremes.

Makes Digesters Safe. The St. Regis Paper Company's Pensacola, Fla., plant solved a safety problem with its digesters by using six small interlocks operated by a single key.

Pulp digesters cook wood chips with "black liquor" under high temperature and pressure. After each batch is cooked, it is discharged into a header through a blow valve.

As soon as pressure is relieved in the digester after a blow, a bolted cover on the top of the digester is removed manually, and the digester recharged with chips and liquor.

The danger in this operation comes when one of the plant's six digesters has its cover removed and its blow valve open. If another digester is blown under these conditions, its contents will be forced by pressure through the open valve of the discharged digester and out the top.

St. Regis tried signal lights and limit switches. This system could be defeated by the failure of light or switch, or the failure of an operator to see light or to obey it.

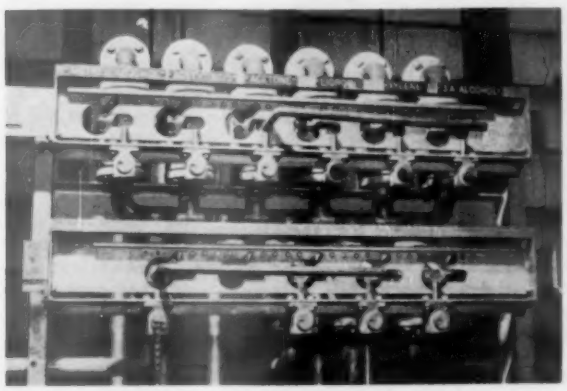
Then St. Regis had an accident. After the accident, R&IE engineers were asked to supply a foolproof system.

They did, and the system was

—*To page 63*

METER GUARDS prevent resetting of meters without proper key. Interlock system at Eastman Kodak Company plant prevents operators from running more than one solvent at a time through solvent distribution system.

BEFORE operator can obtain valve operating lever (top) to open line to the header in Eastman Kodak Company plant solvent distribution line, he must close valve previously open. Then, he removes key to open valve to holding tank.



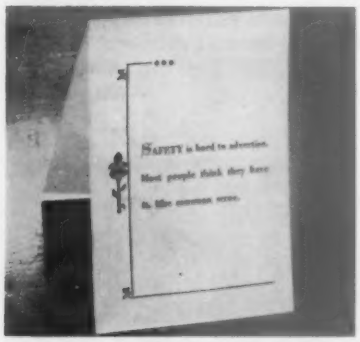
IDEAS THAT WORKED

Devices and Ideas to Help Your Safety Program

By Arthur S. Kelly, Industrial Department, NSC

Tent Cards

Safety methods and other information are featured on Employee Communication Tents shown here. This idea of daily messages or reminders to employees concerning safety, waste, or quality was submitted by Mr. Milton Doerbaum, personnel manager, Bemis Bro. Bag Company, St. Louis, Mo. These "tents" are put on the 200 tables in the cafeteria before and after shift changes. Safety messages comprise 80 per cent of the total. Since 95 per cent of the employees eat in the company cafeteria, Mr. Doerbaum reports that this has proved an excellent medium for getting safety messages to the workers.



Getting Loaded Safely

An effective idea for preventing the upending of a trailer at the loading dock was reported by D. J. Howard, assistant safety director, West Virginia Pulp and Paper Company, Covington, Va.

The device shown in the photograph is a simple cable arrangement with a turnbuckle and U-bolt attached to a cap which fits to the "bull pin" on the underside of the trailer.

This arrangement prevents the trailer from upending when heavy loads enter the trailer from the rear and at the same time prevents the trailer from moving away from the loading dock while being loaded.

LAST MONTH'S WINNER

The winning idea in the October issue was the item "Don't Tread on Me." This idea was for a shaped diamond plate crossover to protect welding cables strung across aisles. The Quincy Yard, Bethlehem Steel Company, originated the idea.

Safety Shoe Display

To publicize the effectiveness and the need for safety shoes in various departments, a special display for shoes which had prevented toe injuries was developed at Minnesota Mining and Manufacturing Co., St. Paul, Minn. The shoe sets on a spring-loaded shelf as shown in the photos. When the shoe is lifted off the shelf for closer inspection, the shelf tips up to disclose a pungent query or statement as shown.

Submitted by A. F. Marcello, safety supervisor.

Dolly Helps Charge Batteries

Handling and exchanging batteries on small fork lift trucks is an awkward and potentially hazardous operation.

Mr. Donald Mock, safety director for American Zinc Oxide Company, Columbus, Ohio, submitted this idea.

A platform dolly consisting of two sets of rollers, four wheels, and a brake was built. This platform can be positioned and locked easily. The battery remains on this dolly while being charged.

Rollers were also installed on the fork lifts where the battery sets. It is a simple matter to move the dolly up to the truck, roll the old battery off, shift the platform, and roll the new battery on to the lift.

Count the Hazards

Here is an "Idea That Worked" from Canada. Mr. J. H. Porter of Kraft Foods, Ltd., Montreal, Quebec, sent in the materials.

The idea was to select the largest number of unsafe conditions and practices to be seen in the cartoon. Only hourly rated employees were eligible to compete. First prize was $20; second prize $10; and the next 10 prizes were $1 each.

The time allowed for submitting entries, on a special entry form, was two weeks.

The French translation is somewhat idiomatic. Literally, it says, "What doesn't go here?"

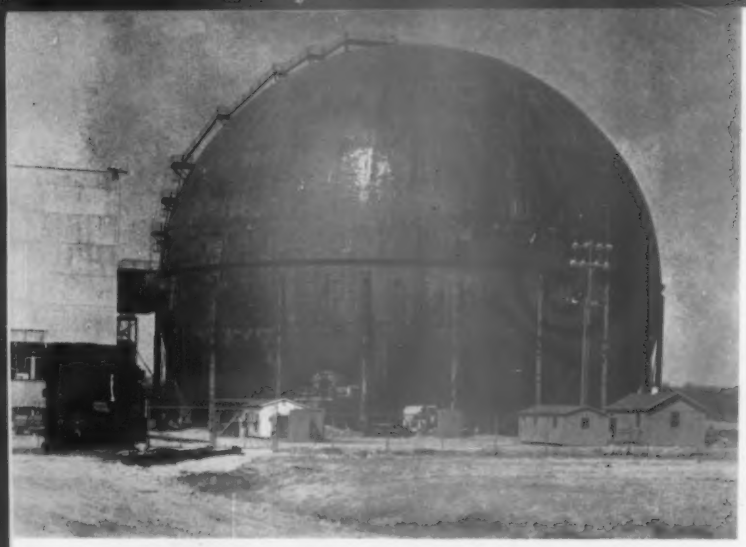
What's wrong here? ——— Qu'est-ce qui ne va pas?

89 NEW PRIZES FOR IDEAS!

Winners of NSC monthly and semi-annual "best ideas" contests now can select one of 89 new prizes, including a personalized copy of the *Accident Prevention Manual*, from a list of individualized home, recreation, and sport items. Value of the awards remains the same as in previous competitions. For the best idea printed monthly, we will present $15 worth of merchandise. Prizes totalling $25 will go every six months to the best of the monthly winners.

Monthly awards now available include clothing accessories, tool attachments, and carving sets, plus electric wall clocks, picnic utensils, pup tents and fishing reels. Six-month prizes range from electric shavers and skillets, attaché cases, and automatic coffee makers to golf bags, plastic wading pools, and battery chargers.

Send a brief description with a photo or drawing to "Ideas That Worked," National Safety Council, 425 N. Michigan Ave., Chicago 11. Any program or safety promotion idea, gadget, or homegrown invention that prevents accidents in your plant is eligible.



CONTAINMENT vessel with 190-ft. diameter houses reactor at Dresden station. Equipment access lock, at left near reactor housing equator, leads to plant building. Personnel lock is left center near the ground.

Personnel can get in and out of this reactor quickly and safely but radioactive material can't escape

Pressure-Sealed Locks Guard Atomic Plant

TO safeguard the vicinity from any accidental escape of radioactive materials and to provide access to its nuclear reactor during operation, the Dresden atomic power plant of Chicago's Commonwealth Edison Company has installed three specially-designed locks to the pressurized reactor housing.

One lock enables quick, safe entry and exit by personnel. Another lock permits access for heavy equipment. The third lock can be used for emergency escape.

Designed by the Chicago Bridge and Iron Company, these locks allow the atomic plant to comply with safety codes calling for housing reactors and other potentially hazardous nuclear materials and processes in pressure-resistant enclosures.

The protective shell for the 180,000-kw capacity reactor at Dresden is a 190-ft.-diameter, self-supporting leak-tight sphere designed to withstand 29.5 psig internal pressure with a 250 F temperature rise.

The sphere includes the reactor vessel and portions of the primary coolant circuit. Built to recently-revised ASME Boiler and Pressure Vessel Code provisions, the housing has been constructed with a liberal safety factor to contain any lethal radioactive materials that might be released by accident or reactor failure.

The locks providing access for personnel and equipment to the pressure-tight shell are basically chambers with two sets of doors, only one of which may be opened at one time. The doors connect the interior of the containment vessel with adjacent buildings or the outdoors.

In each air lock the two doors are interlocked so only one may be opened at any one time. Since pressure in the vessel will produce forces against the inward-opening doors, two pressure equalizing valves in the lock permit equalizing the pressure across each door. The valves also are interlocked so both cannot be open at the same time and neither door can be opened unless the opposite valve is closed.

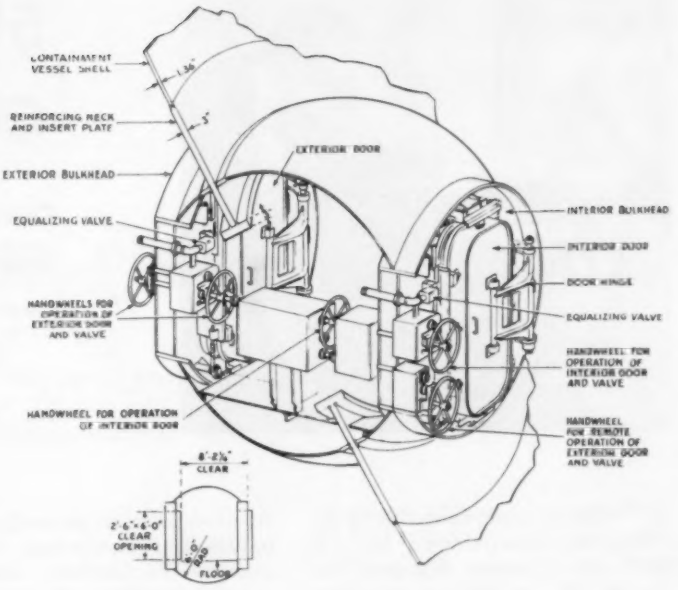
Using the Locks. Operation of the three locks is much the same. Four basic functions must be performed in passing through each door. These functions are performed automatically by a single push button or manually by operation of the appropriate hand wheel.

If a person wishing to leave the vessel finds the interior door closed, he will push a button or operate the interior door hand wheel. Either action will cause four operations to be performed in sequence:

1. The mechanical interlock will be engaged, keeping the exterior door shut until the interior door and its relief valve are again sealed.
2. The interior equalizing valve opens to equalize the pressure between the lock chamber and the vessel.
3. The interior door unseats from its gasket further equalizing pressure between the lock and the vessel interior.
4. The door swings open on its hinges.

Now a departing person may enter the lock. But before he can open the exterior door to leave, he must first close the interior door. Operation of the interior door hand wheel or push button

BASIC DESIGN and operating features of the personnel access lock.



in the lock reverses the four steps just described. With the interior door and valve both fully closed, he may proceed through the lock by opening the exterior door in a similar manner.

In normal practice the exterior door will always be left closed. The interior door on the escape lock will usually be left open, since it is used in only one direction. When the locks are used in both directions, the interior door will also be left closed.

If the exterior door is inadvertently left open, the interlock would be engaged and the interior door could not be opened. However, an extra control is provided on the vessel side of the interior door to operate the exterior door from inside the shell.

Design Features. Although the three locks have the same basic design features, the escape lock is meant for emergencies only, is not push-button operated, and does not have the refinements of the two larger units.

On the two large locks, pointer indicators on each hand wheel indicate the door and valve orientations relative to hand wheel position. Color-coded indicator lights at each push button indicate the conditions for each door: valve closed, door sealed; valve open, door sealed; door shut but not sealed; door open. "Door-in-use" lights are also located at the interior and exterior stations.

The principal requirement for the door-locking mechanisms is to provide a tight seal quickly and with minimum manual effort. Operation must be simple to avoid

—To page 116

PERSONNEL can enter the containment vessel through the spherical pressure lock located below the housing's equator.

CLOSE-UP VIEW of the equipment lock which provides access to the containment vessel from the building.

SEEING EYES ON THE JOB

Correcting visual defects and providing eye protection brought down the accident rates

By J. A. POTTER, O.D.

A VISION conservation program, established by the Malleable Castings Company of Peoria, Ill., is helping maintain and improve the visual efficiency of its workers.

Begun in 1956, this activity reduced eye injuries by 42 per cent within five months after the program's inauguration. And early in the campaign's history, it had averted potential loss of or injury to workers' eyes in at least four instances, as a result of the wearing of protective eye equipment; in fact, none of these workers suffered eye injury or lost time from work.

Initial planning for the program started in the summer of 1956. Preliminary investigations included studies of operations by plant personnel, determination of visual skills necessary in the different departments, and a pattern of minimum visual skills desirable for various job classifications.

The firm then selected a visual-skill testing instrument, chose suitable types of protective eyewear practical for foundry work, and notified employees and professional eye specialists in the community about the project. Letters and personal efforts by management and the vision consultant achieved these contacts.

Late in December 1956, visual-skill testing began on 238 employees, first with supervisors, then with men in the plant. Of these, 128 (53.7 per cent) were found below visual standards desirable for their jobs. And 53 persons wore inadequate corrective eyewear—a practice generally due to outdated prescriptions; the remaining 75 workers, without a correction previously, were referred to local eye specialists for visual analysis and recommendations.

The plan provided that top management, supervisors, and foremen receive and use the first protective eyewear to set an example for other employees. As each department completed testing, those in need of visual care were referred to professional eye experts. The vision consultant fitted workers needing only protective eyewear. Employees requiring corrective-protective eyewear were fitted by their doctor. This gave every person properly fitted glasses adjusted to his facial contours, and included side shields where needed, goggles for grinders, and absorptive lenses for furnace men.

The vision program was considered in effect by July 1957. Testing results showed one of the simplest methods to determine need for a vision program in a plant would be to check the number of employees more than 40

—*To page 125*

EMPLOYEES NEEDING VISUAL CORRECTION

(By age levels)

Age	Number Employees	Needed Correction	Percentage	Had Previous Correction
25	*26*	*4*	*15.3*	*2*
30	*19*	*7*	*36.8*	*2*
35	*25*	*7*	*28.0*	*3*
40	*34*	*19*	*55.8*	*7*
45	*35*	*25*	*70.1*	*5*
50	*32*	*27*	*84.6*	*9*
55	*27*	*27*	*100.0*	*11*
60	*18*	*18*	*100.0*	*15*
65	*16*	*16*	*100.0*	*13*
Over 65	*6*	*6*	*100.0*	*4*

OCCUPATIONAL ACCIDENTS—1957

	January-June	July-December
Total injuries	*97*	*24*
Disabling injuries	*12*	*4*
Days lost	*197*	*19*

A NATIONAL SAFETY COUNCIL
TECHNICAL SERVICE

DATA SHEET D-470

(Revision of former D-300)

BLOW TORCHES AND PLUMBERS' FURNACES

Published by National Safety Council

425 North Michigan Avenue, Chicago 11

1. Furnaces and torches using liquefied petroleum gas, gasoline, kerosene, or acetylene as fuel present hazards of fire or explosion because of the flammable and explosive characteristics of the fuel and the pressure at which it is handled or used. This data sheet outlines the regulations and precautions which should be observed in the construction, maintenance, use, and storage of such equipment in order to prevent serious accidents and fires.*

This Data Sheet is one of a series published by the National Safety Council, reflecting experience from many sources. Not every acceptable procedure is necessarily included. Data Sheets should not be confused with American Standard Safety Codes, federal laws, insurance requirements, state laws, rules and regulations, or municipal ordinances.

General Precautions

2. The general precautions indicated here apply to all types of torches and furnaces.

3. Cylinders, furnaces and torches, and accessory equipment, such as gauges and hoses, should not be dropped, struck, or otherwise subjected to damage. In street work, they should not be placed where they may be struck by passing vehicles.

4. Every torch and furnace should be provided with a complete set of operating instructions, preferably on a metal plate that is a permanent part of the equipment. Instructions should clearly detail procedures for filling, pumping up air pressure (on gasoline and kerosene types), lighting, and extinguishing.

5. No one should be permitted to use a torch or a furnace until he is familiar with the operating instructions, and until his job performance is judged to be competent by his supervisor.

6. Where flammable or explosive dusts or vapors may be present, torches and furnaces must not be used until the atmosphere has been cleared and the sources of such dusts or vapors shut off.

7. Cylinders, furnaces, and torches should never be taken into manholes, vaults, trenches, or excavations. Torches and furnaces should not be used in small, unventilated spaces because they may heat up and thus become a source of explosion. Windshields should be placed at least 6 inches from furnaces to allow for air circulation.

8. Pots should be heated carefully to prevent overflow or ignition of the material in them.

9. At frequent and regular in-

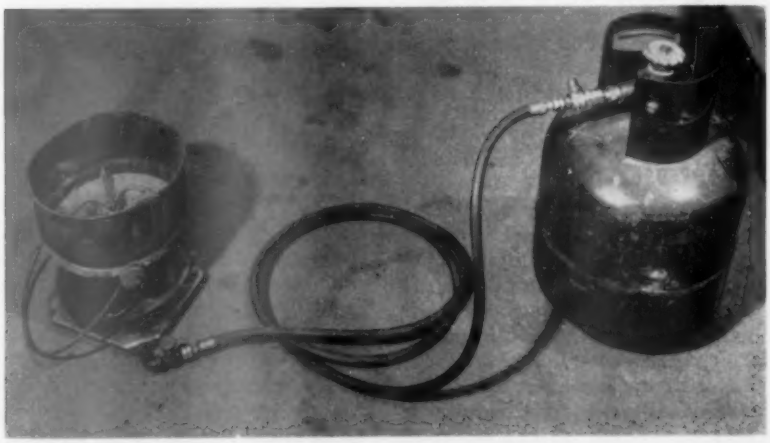


FIGURE 1. LP-Gas being used to heat plumbers' furnace. (Courtesy Commonwealth Edison Co., Chicago)

*The hazards involved in storage and handling of the fuel itself may be minimized by careful adherence to accepted standards, such as "National Fire Codes," Vol. I, *Flammable Liquids and Gases*, National Fire Protection Association, Boston 10, Mass., and *Storage, Handling and Use of Flammable Liquids*, Pamphlet No. 30, National Board of Fire Underwriters, New York 38, N. Y.

tervals, all torches and furnaces should be inspected and tested by competent persons for proper operating condition. Defective appliances should be reported at once to a designated official. They should not be used until the defects have been properly repaired.

10. Torches and furnaces should be repaired only by designated and properly qualified persons. Leaking or otherwise defective pressure-containing parts should not be repaired; they should be replaced with new parts.

11. When torches or furnaces are used to heat or melt materials such as lead, zinc, or paints, which may give off toxic fumes, proper exhaust or ventilation to remove such fumes should be provided. Suitable ventilation should also be provided for fumes and gases (such as carbon monoxide) which may be generated by the appliances themselves.

12. When torches or furnaces are to be used in confined spaces which cannot be adequately exhausted or ventilated, workers should be provided with appropriate respiratory protective equipment. When a torch is used for operations near or above eye level, eye protection should be worn.

13. When a fuel cylinder connected to a heating unit is equipped with a safety relief valve, the valve should be set to discharge at 25 per cent of the calculated bursting pressure of the cylinder.

14. Combustible materials in locations where torches or furnaces are to be used should be either protected or kept far enough away to prevent their being subjected to dangerous temperatures. Appropriate fire fighting equipment must be conveniently located for emergency use.

15. Torches should not be pointed in such a manner as to endanger passers-by. The flames should be extinguished before torches are set aside. Torches and furnaces must not be left burning unattended.

FIGURE 2. LP-Gas is used as fuel for this torch. Note the Y-connection on pressure regulator outlet for operation of other equipment. (Courtesy Commonwealth Edison Co., Chicago)

Liquefied Petroleum Gas (LPG) Torches and Furnaces

Hazards

16. The explosive hazard of liquefied petroleum gas is similar to that of manufactured or natural gas. The explosive ranges of the various gases used fall between 1.55 per cent and 9.50 per cent by volume with air.

17. Since liquefied petroleum gas is heavier than air, it tends to collect in low spots and diffuse slowly. For this reason, work and storage areas must be well ventilated. The container in which this gas is stored and shipped as a liquid under pressure constitutes an additional hazard and must be handled with care.

Construction

18. Liquefied petroleum gas cylinders or "bottles" used to supply torches and plumbers' furnaces must be constructed, tested, and marked in accordance with the requirements of the Interstate Commerce Commission (in Canada, with the requirements of the Board of Transport Commissioners).

19. The specified safety devices are a shut-off valve and a safety relief valve designed to prevent rupture of the cylinder in case it is subjected to abnormally high temperature or fire.

20. Safety relief valves, shut-off valves, and pressure regulators must be tested and approved by the Underwriters' Laboratories, Inc., the American Gas Association Testing Laboratories, the Underwriters' Laboratories of Canada, or other recognized testing laboratories, and must bear the label, seal, or mark of the testing agency.

21. A screw plug should be provided for sealing the cylinder outlet connection to prevent gas from escaping if the hand valve is tampered with when the regulator is removed.

Maintenance and Operation

22. Liquefied petroleum gas torches and furnaces and the gas cylinders used with them must be maintained and operated in accordance with the manufacturers' instructions and with the following precautions.

23. Each cylinder must be maintained, inspected and tested periodically, and marked with the re-

test date, as specified by the ICC (BTC in Canada). Cylinders not so marked must not be used.

24. Containers should be refilled only by the manufacturer or by a supplier properly equipped to perform this operation without overfilling.

25. The cylinder valve should be kept tightly closed at all times except when gas is to be used—even when the cylinder is empty.

26. Before the furnace or torch is lighted, all connections should be checked for tightness and tests should be made for gas leaks. Large leaks may be detected by the odor of LP-gas. The regulator and furnace or torch connections should be painted with soapy water to test for small leaks. *An open flame should never be used to test for leaks.* No attempt should be made to repair a leak other than to tighten connections.

27. When a torch is being lighted, the burner should always be directed away from the operator, nearby persons, and flammable objects.

28. When in use, cylinders must be secured in vertical position. Otherwise, liquid propane may be forced from them.

29. When equipment is being shut off, both the cylinder valve and the furnace or torch valve should be closed tightly. The cylinder valve should be closed first to burn the gas in the hose.

30. The torch or furnace should be allowed to cool before the hose is wound around the tank and the equipment is stored.

31. When a cylinder is to be transported, the regulator must be disconnected and the cylinder orifice plugged with the screw plug provided for that purpose.

32. Liquefied petroleum gas should not be allowed to escape in large quantities into the open. Being heavier than air, it will spread over the ground and at the same time mix with air, forming a blanket of explosive mixture which may drift with the wind a considerable distance before becoming too diluted to burn.

33. Should a liquefied petroleum gas fire occur, the best method of extinguishment is to stop the flow of gas. If the cylinder shutoff valve cannot be reached or it fails to stop the flow of gas completely, the cylinder should be moved to an open well-ventilated area, the local distributor and the local fire department should be notified, and the fire should be permitted to burn until the gas supply is exhausted.

Storage

34. Empty cylinders should not be stored, but should be returned to the supply depot promptly with the shutoff valve closed and the cylinder orifice plugged.

35. The total capacity of any given number of cylinders stored within a single building should be limited to 2,000 cubic feet of gas (250 pounds). Cylinders whose total gas capacity is greater than 2,000 cubic feet should be stored outdoors or in a separate building. The valves and safety devices of cylinders stored outdoors should be protected against accumulations of ice and snow.

36. Cylinders should never be stored below ground level in such locations as basements, manholes, cable vaults, trenches, or excavations.

37. Cylinders stored inside buildings should be placed where they will not be subject to any unusual rise in temperature, physical damage, or tampering by unauthorized persons. The storage area should be ventilated, and the cylinders should be placed at least 20 feet from flammable liquids, such as oil or gasoline, and at least 10 feet from other readily ignitible material.

38. Suitable warning signs should be posted to keep open flames, lighted cigarettes, and similar sources of ignition away from the general storage area.

39. Cylinders should be stored in vertical position with their outlet valves closed and plugged, and their valve protecting caps in place. Each regulator must be disconnected and its cylinder orifice plugged.

Gasoline Torches and Furnaces*

40. Since gasoline has a flash point of —45 F, any spark or flame will set it afire at normal temperatures. Its ignition temperature is 536 F, and its explosive range is from 1.4 per cent to 7.6 per cent by volume with air. The fact that gasoline must be handled in a separate container and poured from it into the torch or furnace creates an additional hazard.

Construction

41. The shells of gasoline blow torches and plumbers' furnaces must be substantially constructed of wrought iron, steel, or brass thick enough to withstand rough handling and six times working pressure without leaking or permanent distortion. Shells made of wrought iron or steel should be coated both inside and outside with tin or other suitable corrosion-resisting material, or shells should be made of corrosion-resisting steel.

42. Joints should be reinforced where necessary and should be brazed, welded, roll seamed, or soldered, or provided with interlocking fittings and soldered.

43. The liquid capacity of gasoline blow torches must not exceed 2 quarts, and that of plumbers' furnaces must not exceed 2 gallons. Either the filler opening should be provided with a seal tube, or some other acceptable provision should be made to ensure these liquid capacity limita-

*Text concerning construction, maintenance, operation, and storage of gasoline blow torches and plumbers' furnaces substantially abstracts NFPA Code No. 393, "Gasoline Blow Torches," which was prepared by a joint committee of the National Fire Protection Association and the National Safety Council, and published in "National Fire Codes," Vol. I, *Flammable Liquids and Gases*, National Fire Protection Association, Boston 10, Mass.

FIGURE 3. Gasoline-fueled plumbers' furnace with shield to protect flame from the wind. (Courtesy Commonwealth Edison Co., Chicago)

tions and to provide sufficient air space above the liquid. Insufficient air space will necessitate unduly frequent renewal of the air pressure during operation.

44. Bottoms should be raised from the edge of the fount to reduce the possibility of their being punctured by objects on which the torches or furnaces may be placed. Bottoms should be dished or otherwise reinforced when necessary to ensure sufficient strength.

45. Every gasoline blow torch and plumbers' furnace should be designed to possess good balance and to minimize the possibility of its overturning.

46. Handles fastened to the tank should be so constructed that if they come loose, leakage will not result.

47. Closure caps or plugs for filler openings should form an air-tight seat with the filler opening bushing, and should be so designed that pressure in the fount will be relieved before the cap can be removed from the filler opening.

48. Fount assemblies, including valves. should be designed with a factor of safety of at least 6, based on a working pressure of not less than 25 pounds per square inch. Each fount assembly should be tested by the manufacturer to at least twice the manufacturer's recommended normal working pressure and proved tight before leaving the factory.

49. Needle valve handles should be made of a material that is low in heat conductivity.

50. Each torch or furnace should be permanently marked in a conspicuous manner with the name of the maker.

51. The manufacturer should subject each completely assembled torch or furnace—or its essential operating parts prior to assembly—to an appropriate inspection and operating test before packing for shipment.

Maintenance and Operation

52. Anyone whose clothing has grease, gasoline, or similarly flammable substance on it should keep at a safe distance from burning torches or furnaces.

53. Gasoline blow torches and plumbers' furnaces should, preferably, be filled out-of-doors. If they are filled indoors, the operation should be performed at a point remote from open flames, sparks, or other sources of ignition. The torches or furnaces must not be filled while hot. To eliminate the possibility of static sparks, a ground wire should be attached by means of "alligator" clamps to the pouring vessel (safety can) and to the container receiving the gasoline.

54. Gasoline containing lead compounds or benzol should not be used.

55. Laundry soap may be used on the threads of the filler plug to ensure a tight seal. The filler plug should be tightened gently; forcing it may ruin the gasket or strip the threads of the plug. The filler plug should not be loosened while the burner is hot.

56. No device other than the pump supplied with the torch or furnace by the manufacturer should be used to pump up the pressure. Torches and furnaces should not be altered to permit use of other methods.

57. Torches and furnaces should not be pumped up to excessive pressures at any time. The manufacturer's instructions for recommended strokes to be used on the pump and for the amount of fuel to be put in the tank should be followed.

58. The priming cup should not be overfilled. If it is, the gasoline may flow over the tank and become ignited, thus furnishing sufficient heat to develop a dangerous pressure within the tank. If gasoline should flow over the tank, it should be carefully wiped off before the torch or furnace is lighted.

59. Torches or furnaces should not be lighted until they have been carefully examined for leaks, and until nearly all the gasoline in the priming cup has been consumed. Immediately after the appliance has been lighted, the flame should be shielded from the wind.

60. Torches and furnaces should preferably be preheated and lighted out-of-doors. The use of any preheating device other than

those provided by respective manufacturers should be prohibited.

61. Stuffing boxes should be kept tight to prevent leaks around the valve stem. They should not be tightened while the torches or furnaces are in use.

Storage

62. Before torches or furnaces are stored, they must be allowed to cool. The pressure in the tanks must then be released and the valves secured.

63. Torches and furnaces should be stored in metal cabinets away from combustible materials.

64. Gasoline should be stored in safety cans and in accordance with accepted standards for storage and handling of flammable liquids, such as NFPA "National Fire Codes," Vol. I, *Flammable Liquids and Gases*, and also in accordance with pertinent local laws or regulations.

Kerosene Torches and Furnaces

Hazards

65. The flash point of kerosene is approximately 100 F, and its explosive range is from 0.7 per cent to 5 per cent by volume with air. Its explosive hazard, therefore, is much less than that of gasoline.

Construction

66. Construction requirements for kerosene torches and furnaces are generally the same as those for gasoline torches and furnaces. (See paragraphs 41 through 51.)

Maintenance and Operation

67. Precautions to be followed in maintaining and using kerosene torches and furnaces are similar to those for gasoline torches and furnaces. (See paragraphs 52, 53, and 55 through 61.)

68. Gauges and hoses used with kerosene torches or furnaces must be kept in good condition. Periodic tests for leaks should be made with soapsuds, and the hose must be kept away from the heat and the flame.

Storage

69. Storage requirements for kerosene torches and furnaces and for kerosene are the same as those indicated in paragraphs 62 through 64.

FIGURE 4. Acetylene tank and torch. Note the stand used to maintain vertical position of the tank, and wrench secured to the tank. (Courtesy Commonwealth Edison Co., Chicago)

Acetylene Torches and Furnaces

Hazards

70. Acetylene has an explosive range of from 2.5 per cent to about 81 per cent by volume with air, which is a wider range than that of any other gas used in industry. Because of its explosive nature, acetylene is dissolved in liquid acetone. Since free acetylene is highly flammable, care should be exercised in handling cylinders and using torches. Acetylene is stored and shipped under pressure, and the pressurized containers present an added hazard.

Construction

71. Cylinders for the storage and shipping of acetylene should conform to the regulations of the ICC (BTC in Canada). These regulations specify that each cylinder shall be filled with a porous inert filler plus a suitable solvent, usually acetone.

72. Cylinders are manufactured, tested, and marked in accordance with these regulations, and such markings must not be tampered with.

73. Each tank is equipped with a fusible plug which melts at a temperature slightly above that of boiling water. Such a plug is provided to minimize the possibility of an explosion should the tank become heated.

74. All cylinders should be equipped with a metal cap to protect the discharge valve against damage.

75. Valves and pressure regulators must be tested and approved by the Underwriters' Laboratories, Inc., the American Gas Association Testing Laboratories, the Underwriters' Laboratories of Canada, or other recognized testing laboratories, and must bear the label, seal, or mark of the testing agency.

Maintenance and Operation

76. Acetylene torches, furnaces, and cylinders must be maintained and operated in accordance with the manufacturer's instructions and with the following precautions.

77. When in use, a cylinder should be in vertical position and secured to prevent its overturning. Cylinders that have been in a horizontal position should not be used for at least five minutes after they have been placed upright. This interval is to allow the acetone to drain away from the valve.

78. Clamps, chains, stands or hand trucks can be used to keep cylinders upright.

79. Cylinders should be refilled by the supplier only.

80. Repairs to cylinders, hoses, regulators, and gauges should be made only by the manufacturer or a reputable supplier. Oil must never be used on gauges and regulators.

81. When cylinders or containers are not in use, the valves should be kept tightly closed—even when the cylinders are empty.

82. Before the torch or furnace is lighted, all connections should be tightened and tests should be made for gas leaks. Large leaks may be detected by the characteristic odor of acetylene. Small leaks may be found by painting the connections with soapy water. *An open flame should never be used to test for leaks.* No attempt should be made to repair a leak other than to tighten connections.

83. Use of liquid acetylene should be prohibited.

84. Under no circumstances should acetylene gas be brought in contact with unalloyed copper. Blowpipes and torches are treated to prevent a chemical reaction.

85. Line or hose pressure should not exceed 15 pounds per square inch when acetylene is being used.

86. The regulator should be disconnected and the cap replaced when the cylinder is to be stored or transported. Before a regulator is removed from a cylinder valve, the valve should be closed and the gas released from the regulator.

87. The cylinder should be kept away from heat, fire, and the direct rays of the sun, and should always be at least 4 feet from open flames. When a torch is being lighted, the burner should always be directed away from the operator, nearby persons, and flammable objects. The lighter—not matches—should always be used to light the torch.

88. If a fire occurs while the equipment is in use, the gas should be turned off at the tank valve. If the valve cannot be reached, the cylinder should be moved to an open well-ventilated area and all personnel required to stay at least 100 feet away. If the valve cannot be reached and the cylinder cannot be moved, the cylinder should be cooled with a water spray. During or immediately after such action is taken, the local fire department and nearest distributor should be notified with least delay.

89. Acetylene cylinders should never be used for any purpose other than as containers for acetylene.

Storage

90. The total capacity of any given number of cylinders stored within a single building should be limited to 2,000 cubic feet of gas. Cylinders with a total capacity in excess of 2,000 cubic feet of gas should be stored outside or in a separate building.

91. Cylinders should be stored in well-ventilated areas where they will not be subjected to any unusual rise in temperature (in no case above 130 F), physical damage, or tampering by unauthorized persons. Suitable warning signs should be posted to keep open flames and other sources of ignition away from the storage area.

92. Cylinders may be stored in the open provided that valves and safety devices are protected against accumulations of ice and snow and against the direct rays of the sun.

93. Acetylene cylinders should not be stored with oxygen cylinders.

ACKNOWLEDGMENT

The revision of this data sheet was prepared by W. L. Clifton, Hydro-Electric Power Commission of Ontario, Canada, as a project of the Public Utilities Section of the National Safety Council. It has been extensively reviewed by members of the National Safety Council and representatives of chapters of the American Society of Safety Engineers. The revised data sheet has been approved for publication by the Publications Committee of the Industrial Conference of the National Safety Council.

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Circle Item No. 11—Reader Service Card

CONSULTATION CORNER

By L. C. Smith, *Industrial Department, NSC*

Got a problem in accident prevention or occupational hygiene? Questions are answered by mail, a few of general interest being selected for publication here

Wire Rope Inspection—How? When?

Question: Can you give us some information on the inspection of wire rope?—frequency, types of inspection—visual or otherwise.

Answer: Frequency of inspection of a rope depends largely on service conditions. At regular intervals, a specially trained inspector should examine ropes on which human life depends. Some mines, for instance, make a daily inspection for readily observable defects, such as kinking and loose wires, and a thorough inspection at least weekly. For the latter inspection, the rope speed is generally less than 60 feet per minute.

The inspector checks closely for wear of the crown wires, broken wires, kinking high strands, loose wires, nicking, and lubrication. Rope calipers, special diameter tapes, and micrometers are used to determine changes in the cross section of rope at various locations. In some cases elongation is measured as an indication of fatigue.

Measurements of circumference and diameter are critical since, for example, a decrease of 1/16-in. in the diameter of a 1½-in. rope amounts to a 4 per cent reduction in diameter and an 8 per cent decrease in the sectional area. However, the total area of the wire is about 55 per cent of the total rope area so that the calculated decrease in strength is about 14.5 per cent. Such a loss of strength is considered to indicate marked deterioration in the rope.

The number of broken wires per lay is one of the principal bases for judging the condition of a rope. If most of the broken wires in a lay are concentrated in several strands, that section of the rope is weaker than it would be if the broken wires were uniformly distributed throughout all strands and along the length of the rope. If, however, the number of broken wires along the length of a rope increases rapidly between inspections, the rope is becoming fatigued and nearing the end of its useful life.

Regulations covering the number of broken wires permitted in a given section of rope vary considerably. Some regulations specify no more than 6 broken wires in one strand per lay. A mining state specifies that a rope must be discarded when the number of broken wires in a foot amounts to 10 per cent of the total.

The loss of metal due to wear of the crown wires is generally limited to 35 to 40 per cent. However, the number of broken wires and the wear in a given section have major significance only when there is no corrosion.

Since there is no accurate method of determining the remaining strength of a rope in service, experience and judgment of all factors, combined with the length of time in service and the tonnage hoisted or other unit for judging the work done by the rope, determine when it should be discarded.

You may want to follow the same procedures as do some of the large steel mills where they use the rope for a period of time such as a month and then discard it regardless of the condition. These companies usually keep a record of the following:

1. Date when placed in service.
2. Number of trips made or tons hauled.
3. Dates on which rope was lubricated.
4. Record of any unusual happenings that might affect the life of the rope.

Based on past experience they can expect the rope to give satisfactory service for a specified period of time providing nothing unusual has happened to the rope.

Slides from Slidefilm?

Question: Can I project National Safety Council sound slidefilms on a 2 x 2 slide projector if I cut the frames apart and mount them in separate slides and use an ordinary phonograph to play the record?

Answer: It would not be practical to use a 2 x 2 slide projector and phonograph to project sound slidefilms in the manner you suggest.

The frames in a slidefilm are just half the size of the picture in a 2 x 2 or ordinary 35mm slide such as you get when you use your 35mm camera. The width of a slidefilm frame is equal to the height of a full size 35mm frame. The height of the slidefilm frame is one-half the width of the full 35mm frame.

It is physically possible to mount the slidefilm pictures in a 2 x 2 frame. However, the openings in standard 2 x 2 slide mounts will not fit the half-frame size of slide film scenes, and special mounts would be required. Some people do cut up slidefilms and use the pictures in this way when they want to show selected pictures of some special process. Doing it for a whole film would be a laborious process and the resulting image on the screen would not be as good as if the pictures were shown in the way they are intended to be shown.

Frames in a slidefilm change at from three seconds to nine seconds intervals which would keep you busy following the slidefilm record.

Perhaps a more serious difficulty is that many slidefilm recordings are on 16-in. records which will not fit many turntables. The speed of all our sound slidefilm recordings is 35 rpm.

—To page 156

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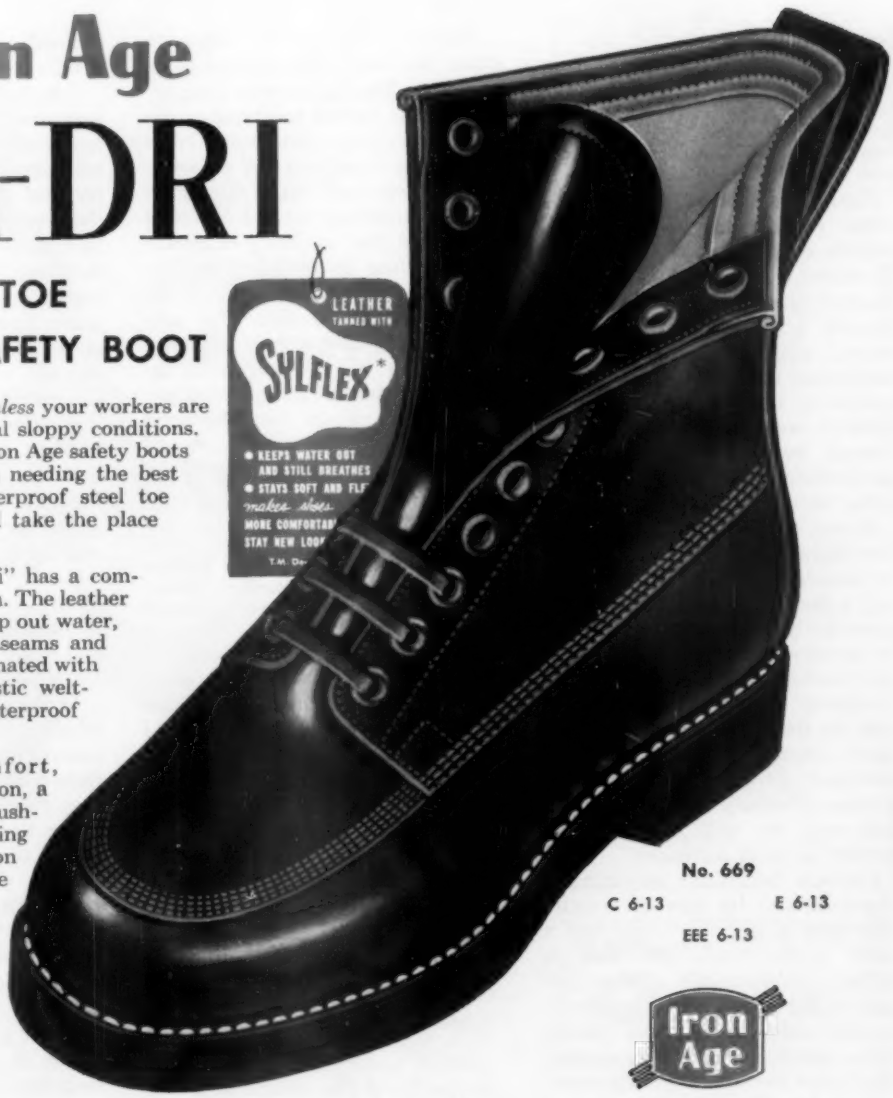

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INDUSTRIAL HEALTH

Abstracts of current literature
on Occupational Hygiene, Medicine, and Nursing

By E. L. Alpaugh, *Industrial Hygienist, NSC*

Beryllium Poisoning

"Current Knowledge of Beryllium Poisoning," by Harriet L. Hardy, M.D. *Occupational Safety and Health*, April-June 1958. Published by the International Labor Office, Geneva, Switzerland.

HISTORY of illness in industries using certain beryllium compounds dates back over the past 25 years. Evidence from epidemiological, industrial hygiene, and clinical investigation, and from animal experiment supports the conclusion that distinctive disease occurs in beryllium-using industries. A worker may carry home enough beryllium compound on his clothes to result in illness in some member of his family.

Acute and chronic aspects of beryllium poisoning are discussed. In the event of high exposure during a short period, such as may occur in the extraction industry or in certain machining operations, the worker will develop sudden shortness of breath, cough and pain in the chest. An x-ray will show changes indicative of a chemical pneumonia. If this worker promptly receives oxygen and rest, he will recover completely in most instances.

Chronic beryllium poisoning is characterized by loss of weight, shortness of breath, cough, and a chest x-ray much like that in miliary tuberculosis. Other organs of the body may be involved: lymph nodes, liver, and spleen. Skin reactions, including dermatitis, may also result from exposure to beryllium compounds.

It is difficult to make a correct diagnosis in a case of chronic beryllium disease, because the onset of the disease may be delayed for years after the last exposure to a toxic beryllium compound; x-ray changes may resemble changes in other diseases. Treatment is discussed.

Industry has taken steps to meet the beryllium-poisoning problem. The fluorescent lamp industry has agreed to abandon the use of beryllium phosphors. Other operations involving use of beryllium compounds are conducted with engineering control designed to reduce the worker's exposure to less than two micrograms of beryllium per cubic meter of air for an eight-hour day. For any exposure, however short, it is not permissible for the worker to inhale more than 25 micrograms per cubic meter of air. Neighborhood beryllium contamination should be kept as near zero as possible.

Radiant Heat

"Recognition and Control of Radiant Heat," by George C. Stoecker, *Industrial Medicine and Surgery*, August 1958.

POSSIBILITY of heat strain occurs when body-heat loss by radiation, convection, and evaporative cooling is exceeded by external heat stress. The problem of evaluating heat strain is complex, because the maximum limit of heat exposure has not been clearly defined in terms of readily measurable environmental factors.

"Wonder what the doc meant? Said if I didn't get glasses I'd need a new partner."

Comfort of environment is determined by four conditions: air temperature, temperature of surrounding objects, relative humidity, and air motion. Heat affecting the comfort of an environment can be transferred by convection, conduction, or radiation. Because heat transfer by radiation is fundamentally different, the most elaborate and expensive ventilating air supply systems will not control radiant heat.

Radiant heat behaves similarly to light. It travels in a straight line from its source, needs no medium to transfer, has no effect on the air through which it passes, and is not affected by air movement in the surrounding area. Industrial sources of radiant heat include molten metal, hot castings and forgings, furnaces, and heated glass.

Depending on the material of which the receiver is constructed, radiant heat is transmitted, reflected or absorbed when it strikes the receiver. Absorption will cause the temperature of the receiver to rise. Most building materials (brick, wood, concrete, steel) are good absorbers, as is the human body.

Use of an ordinary thermometer to measure the heat load from a radiant source on an employee results in a considerable error, because the thermometer measures only temperature of air. To overcome this error a globe thermometer is used. The globe thermometer is a hollow metal sphere with a thermometer sealed into the inside air space.

The outer surface of the sphere has a dull black finish to minimize reflection of radiant heat rays. The sphere will absorb energy from a radiant heat source and will in-

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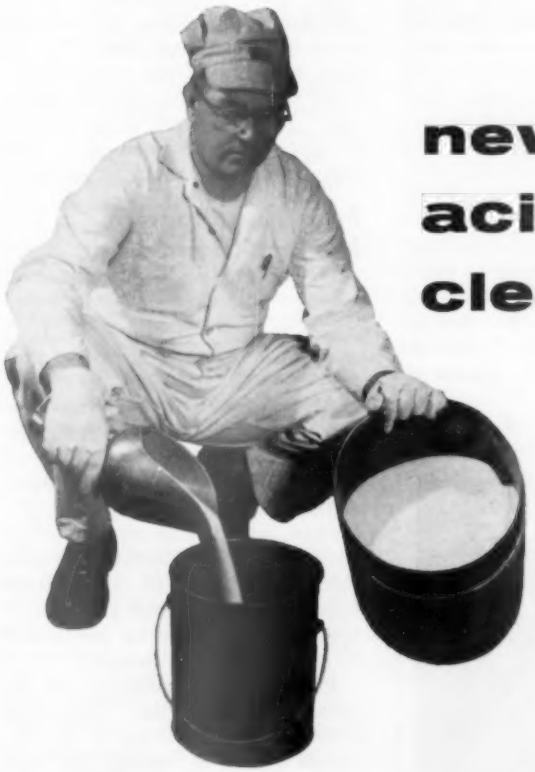

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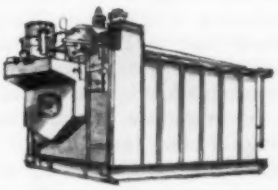

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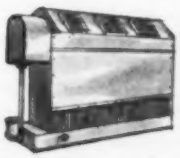

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crease in temperature. Transmitted to the air in the sphere, the corresponding rise in temperature is noted on the thermometer.

Although the accuracy of the globe thermometer is open to criticism, this device will absorb heat energy on the side facing the source and will lose heat by convection and reradiation in all directions away from the source, simulating an employee. If a globe temperature of 120 F and an air temperature of 85 F are observed at the same location, the heat load on the employee at that location should be considered 120 F.

Shielding is of primary importance in protecting employees or equipment. Shields can be designed for heat exchange, heat absorption, or heat reflection. Depending on construction materials, reflective shields vary in their ability to reflect visible light and infrared or radiant heat.

For example, gold is not a good reflector for visible light but has excellent reflective qualities in the infrared. Vaporized aluminum gives good reflectance through the visible and infrared. Polished aluminum is of medium effectiveness in the visible spectrum and of higher efficiency in the higher infrared wave lengths.

A chrome-plated surface, even though having mirror finish, is relatively poor in both respects. Thickness has no effect on the reflective qualities. Kitchen aluminum foil will reflect radiant heat as well as one-quarter inch of aluminum sheet.

Shielding is usually adapted to the existing situation and can be portable or fixed. Enclosures made of corrugated aluminum can be placed around molten metal pots or furnaces. Openings can be left where necessary, as for pouring spouts, and hinged portions used where loading or servicing operations occur.

Shields can be angled so radiant heat is reflected upward to gravity vents in the roof, allowing convected heat to escape. An example given of an installation allowed reductions in temperatures from more than 160 F to 113 F.

Burns resulting from machine operators touching the metal lampshade housing lighting fixtures on their machines can be overcome by lining the shade with aluminum kitchen foil. Tests showed this procedure reduced the temperature at the apex of a shade containing a 100-w. incandescent bulb from 200 F to 105 F.

Experiments with various shielding showed that black steel reduced the heat load by about 10 per cent. A steel shield painted white gave approximately a 12 per cent reduction. Aluminum paint on steel gave about 50 per cent, asbestos 15 per cent, aluminum (clean) 90 per cent, aluminum (dirty-dusted with ground forging scale) 20 per cent, and aluminized steel about 80 per cent.

Protection Program For Radiation Sources

"Some Factors to Be Considered in a Protection Program for Use of Radiation Sources." By H. W. Speicher. *American Medical Association Archives of Industrial Health*, Vol. 17, May 1958, pp 546-555.

An Adequately-Trained person must have over-all responsibility for safe usage of radioactive materials in any control program. After proper controls are established, adequate supervision should be maintained. Atomic Energy Commission regulations require users of most radioactive materials produced or controlled by the AEC to be licensed.

Exposures to radiation can be external or internal. Protection from direct radiation of an external source is usually the only protection necessary, if there is no danger of breathing radioactive particles or gas.

If it is possible to breath mists, dusts, gases, or fumes containing radioactive materials, an internal radiation hazard exists. Internal radiation is especially dangerous from materials with long half-lives, such as strontium 90. Alpha-emitting substances with long half-lives are very hazardous when breathed or injected into cuts or wounds.

Prior to working with radioactive materials or radiation-producing equipment, employees should have a physical examination consisting of a complete blood examination, including a differen-

—*To page 70*

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OFF THE JOB

Safety programs for plant and community

BY HARRY C. JOHNSON

NSC Staff Representative, OTJ Safety Committee

Off-the-Job Safety Program Needed

Prior to the Congress the NSC Meat Packing, Tanning, and Leather Products Section met in Milwaukee. The National Provisioner *magazine, having published views of the section's ideas on off-the-job safety in its August 2 issue, has kindly granted permission to reprint this article.*

THE NEED for off-the-job safety programming may seem remote until present day fringe costs are examined. Today, with hospitalization and accident policies, many packers assume a varied proportion, up to 100 per cent, of the medical cost involved in accidents that occur off the job, as well as on the job.

Statistically, the home outranks the highway as the place of injury. Likewise, many plants pay the injured employee a stated percentage of his salary, with 60 per cent of base pay being a fairly common figure.

All of these costs, which one industry executive estimates to be eight cents per payroll hour, move up or down with the frequency of the off-the-job injuries the company's employees sustain. The lower this rate is, the lower will be the various insurance costs as they are tied in directly with each policyholder's experience. This is a specific reason why each packer should promote off-the-job safety, according to the executive committee, Meat Packing, Tanning, and Leather Products Section, National Safety Council.

The group heard Richmond Unwin, Reliable Packing Company, Chicago; John Thurman, Oscar Mayer & Co., Madison, and Alex Spink, Kingan Div., Hygrade Food Products Corporation, Indianapolis, report on the President's Conference on Occupational Safety, which they attended at Washington, D. C.

Off-the-job safety received top billing at the conference because of its growing significance in manpower utilization. Off-the-job safety programs are often directed to employees' homes. The mailing piece dealing with a timely topic, such as safety at the beach for summer, ties family interest to safety. Since safety is a habit, the broader its application, the stronger the habit.

Some of the committee members agreed that inserting safety booklets in a company reading rack, located near the time clock, got excellent response. The rack should be kept about 54 per cent filled, as this stimulates peak interest and the employees will take the booklets, observed Howard Rebholz, The Rath Packing Company, Waterloo, Iowa.

Others reported that various safety films which are available from the National Safety Council, insurance companies, and automobile manufacturers were shown during the lunch hour at their plants.

At Reliable Packing Company this is done on a voluntary basis, Unwin told the group. In the lunchroom, the film is continually projected on a special screen that does not require darkness for visibility. At each seat in the viewing range is a set of headphones that the employee can use.

The committee members examined the medical facilities of their Milwaukee host, Charles Elsby of the Employers Mutuals of Wausau. Elsby is the Meat Packing, Tanning, and Leather Products Section [immediate past] general chairman.

Dr. Edward G. Meiter, head of the medical department, explained some of the work being done in evaluating the deleterious effects of sound on hearing. In states where this is a compensable injury, it is best to measure the man's hearing level as part of his pre-placement physical examination.

On noisy jobs, commercially available ear plugs are effective. They keep out the high treble sounds that are distracting and injurious and transmit the low treble sounds that carry the human voice, he declared.

Film on Handicapped Has Premiere

Employees Only, a new motion picture produced for the President's Committee on Employment of the Physically Handicapped and National Employ the Physically Handicapped Week (October 5-11), had its premiere September 19 in Washington, D. C.

The 15-min. film shows how hundreds of these men and women, now working in industry, have been a profitable investment for their employers. Produced by Hughes Aircraft Company, the message is narrated by actor Bob Cummings through interviews with many Hughes handicapped workers.

Arthur Motley, director of the U. S. Employment Service, has advised state employment services directors about this film and has urged states to secure prints for showings to employers in their areas.

Miss Mary Switzer, director of the Office of Vocational Rehabilitation, is making prints of the film available to state rehabilitation agencies.

In October the film was made available to television stations. After November 15 the film will be loaned to civic and service organizations, veterans groups, and others who can obtain prints on loan through chairmen of the state Governors' Committees on Employment of the Physically Handicapped.

THE ACCIDENT BAROMETER

Prepared by the Statistics Division, National Safety Council

ACCIDENTAL deaths in July numbered about 8,600, or 200 fewer than occurred in July a year ago. There were decreases in deaths from motor-vehicle, work and public non-motor-vehicle accidents, and an increase in home accident fatalities.

During the first seven months of 1958, accidental deaths numbered 51,500, or 5 per cent below last year. Each class showed a reduction from 1957 with the largest decrease recorded in motor-vehicle deaths.

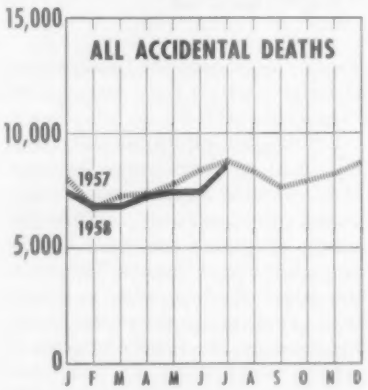
Motor-Vehicle Deaths

The July total of motor-vehicle deaths was 3,140, a reduction of 3 per cent from last year. Compared to 1956, it was a decrease of 12 per cent.

Deaths for the seven months numbered about 19,380, or 7 per cent below 1957. The seven-month death rate per 100,000,000 vehicle miles is not available at this time, but the six-month rate was 5.1, a decrease of 9 per cent from 5.6 in 1957.

For the seven-month period, 33 states had fewer deaths than last year and 15 had more deaths. States with the greatest improvement for the first seven months of 1958 were: West Virginia, —32 per cent; Connecticut, —29 per cent; South Carolina, —26 per cent.

	1958	1957	Change
July	8,600	8,800	—2%
Seven Months	51,500	54,300	—5%



Reporting cities with populations of more than 10,000 had a decrease of 4 per cent for July and 5 per cent for the seven-month period. Cities with more than 200,000 population having the largest reduction in deaths for the first seven months of the year were: Long Beach, Calif., —53 per cent; Toledo, Ohio, —47 per cent; Wichita, Kansas, —36 per cent.

Work Accidents

Deaths from work accidents numbered about 1,200 in July, or 8 per cent fewer than last year. The total for seven months was 7,800, a decrease of 7 per cent from 1957.

The July frequency rate per 1,000,000 man-hours for plants in community council contests was 4.59, a decrease of 18 per cent from last year. The July rate for plants in 16 sectional accident prevention contests conducted by the National Safety Council was 5.36, a reduction of 2 per cent. The seven-month rate in community council contests was 4.62, a decrease of 15 per cent; in sectional contests the seven-month rate was 4.99, down 6 per cent.

Public Deaths

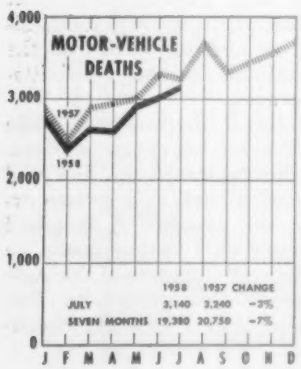
Public non-motor-vehicle accidents in July resulted in 2,200 deaths, or 100 less than last year.

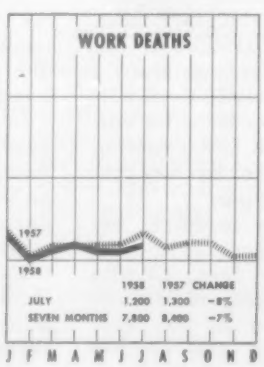
The January-July death total was about 10,000, a decrease of 6 per cent from 1957. This reduction occurred despite the fact that changes in the definition of Home have reclassified some cases to Public. There were decreases in burns, drownings, and falls and increases in transportation and firearms accident fatalities. Fewer deaths occurred among children less than 15 years old and persons in the age groups of 45 to 64 and 65 years and older.

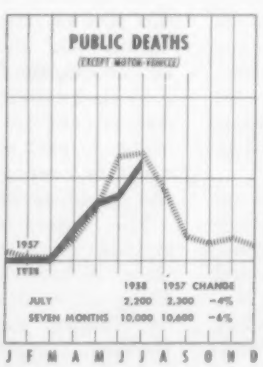
Home Deaths

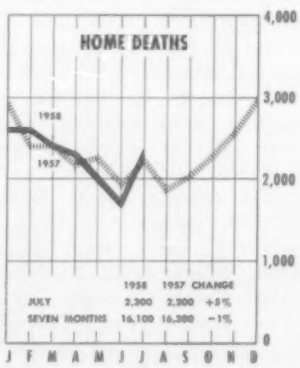
Deaths from home accidents numbered about 2,300, an increase of 100 over July 1957.

The seven-month total was 16,100, a reduction of 1 per cent from last year. Decreases in fatalities from falls and firearms accidents were nearly offset by increases in poisonings, burns, and mechanical suffocation deaths. Increases were reported in deaths of children less than 5 years of age and young people 15 to 24 years old. Other age groups had decreases with the greatest improvement recorded for persons 65 years old and older.









"Take a tip from me—

One slip can cost more than USS Multigrip"

Men who work in slippery places . . . push heavy loads . . . or merely walk up and down stairs know what it means to have sure traction underfoot.

They can't wear shoes with cleats, but you can give them a floor with cleats—USS* Multigrip. Dozens of little studs provide maximum skid resistance in any direction. They are flat on top, easy to walk on—but do not catch the shoe.

Whether a landlubber or a seafarer, Multigrip assures you the same fine service. Wet or dry, Multigrip supplies safety plus.

For locations that take a heavy beating from traffic, Multigrip provides a floor that will stand up under years of constant use. Oil won't soak in and can be easily removed with regular cleaning materials. You save money by having a floor that is easy to sweep or flush clean, lasts for years with no maintenance.

On your next inspection trip, look around for danger spots—and make them safe with Multigrip*. You can get it from our local distributor.

Sold by leading distributors from coast to coast.

United States Steel Corporation – Pittsburgh
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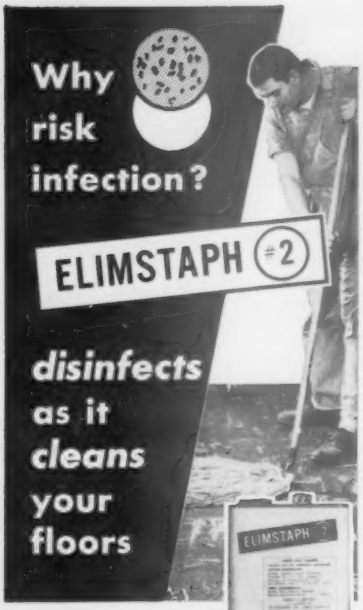

Dangerous bacteria like Golden Staph breed on clean floors, too. Re-dispersed in the air, disease germs can strike *anyone, any time.*

Play it safe. Specify ELIMSTAPH #2 as your daily cleaner. Its phenol coefficient of 33 (certified by U. S. Testing Co.) is 3 to 6 times more powerful than most germicides. Penetrates the wall, disintegrates the entire germ cell from within. *Residual,* it retains killing efficiency as long as it remains on the floor.

Saves you money. You use only one ounce per gallon of water. Cuts labor, too. Does a superb cleaning job, disinfects and deodorizes in one application.

Besides floors, apply ELIMSTAPH #2 on walls, doors, furniture, toilets, showers. Use it to disinfect garbage cans, mops, pails, brushes. Don't wait. Mail the coupon for full data on this amazing product.

Continuing quality tested and approved by QUALITY CONTROLLED YORK RESEARCH CORPORATION

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Circle Item No. 15—Reader Service Card

AROUND THE COMPASS

ACTIVITIES • PROGRAMS • EVENTS

By Nils Lofgren

Field Service Department, NSC

Fire Program Kit Available

A new program kit for women's groups, "The Senior Citizens," has recently been prepared and made available by the National Board of Fire Underwriters.

This kit includes a short speech, suggestions for a panel discussion, a senior safety check list, suggested news releases for local publicity, and a cover that serves as a poster for use on bulletin boards.

Individual copies of this kit may be obtained free by writing to Carol Van Sickle, Staff Editor, National Board of Fire Underwriters, 85 John Street, New York 38.

Baton Rouge Council Names Director

Don D. Hearin, Jr., president of the Greater Baton Rouge (La.) Safety Council, has announced the appointment of Earnest G. Miller as interim director of the Council.

Mr. Miller, a safety supervisor for ESSO Standard Oil Company, will be on loan from his company for approximately six months to work full time with the safety council.

New Manager at Long Beach

The Long Beach (Calif.) Safety Council has named Stanley J. Kelso, long-time resident of Long Beach, as new manager replacing the late James A. Worsham. Mr. Kelso recently retired from the U. S. Navy after 30 years' service. The new manager has had extensive experience in accident prevention. He has worked in community, traffic, and industrial safety programs, including chemical and mechanical protective measures, decontamination techniques, fire prevention, and explosives safety.

Indiana Holds Governor's Conference

The job of going back home and building support for Indiana's priority needs for a traffic safety program improvement, as determined at the Regional Leadership Conferences last spring, was handed to 300 delegates at the Governor's Statewide Traffic Safety Conference in Indianapolis on September 22.

Priority needs were presented to the Conference by Governor Harold W. Handley, who also presented Governor's Traffic Safety Awards to 12 cities, based on accomplishments in the Annual Inventory of Traffic Safety Activities for 1957.

Louisiana Council Prepares Leaflet

Caddo Bossier Safety Council in Shreveport, La. recently prepared and distributed a four page leaflet-questionnaire called "Home, Safe Home" with brief check lists on stairways, floors, storage facilities, kitchen, lights and electrical work, doors and windows, walks, driveways, and outer areas, plumbing, and fire prevention.

Circle Item No. 16—Reader Service Card →

ONLY ATLAS SLINGS GIVE YOU

MAXIMUM FLEXIBILITY

Even in largest capacities, Atlas Braided Slings are the most flexible slings.

A FIRM GRIP THAT HUGS THE LOAD

The special Atlas Braided body easily adjusts itself to the contour of the load. This provides safe, easy handling.

BALANCED BRAIDED BODY

Each of the eight ropes in the alternate right and left lay braided body carries an equal share of the load providing greater safety and longer rope sling service.

EXTREME LIGHT WEIGHT

Atlas Slings are lightweight for their great strength which provides faster rigging, easier handling, and safer hoisting and carrying to save time and money.

EVERY-DAY SLINGS — Macwhyte Company makes a complete line of slings. There are many standard designs available which have been developed through many years of experience in rigging. In addition to the famous Atlas Braided wire rope slings, there are Macwhyte Drew Flat Braided slings, "Safe-Guard" cable-laid slings, grommets, etc. All are factory fabricated to published strengths for maximum safety. Cable assemblies consisting of wire rope with swaged fittings attached are also available for sling purposes and for control needs on machinery and equipment. Ask to have representative call at no obligation and acquaint you with the complete cost saving wire rope and sling service available from Macwhyte Company and its distributor. We welcome your inquiries for prices on your regular or special needs.

There are many standard types and assemblies of Macwhyte Atlas Braided slings readily available and completely catalogued. Also, slings will be made to your design or Macwhyte engineers will design slings to meet your special load handling requirements. There is a Macwhyte representative close by. Ask for special sling circular 5308R and mention whether or not you want representative to call.

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Manufacturers of Internally Lubricated PREformed Wire Rope, Braided Wire Rope Slings, Aircraft Cables and Assemblies, Monel Metal, Stainless Steel, Plastic Coated and Nylon Coated Wire Rope, and Wire Rope Assemblies. Special catalogs available.

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MACWHYTE *Wire Rope* SLINGS

INDUSTRIAL BREATHING HAZARDS MADE SAFE

Bureau of Mines Approval No. 1308

THE MAN WITH THE SCOTT AIR-PAK BREATHES PURE FRESH COOL AIR AT THE LOWEST OPERATING COST*

Operating a sand mill in a foundry.

Worker with Scott Air-Pak cleaning a degreaser.

In temperatures from 20° below to oven heat the Scott Air-Pak delivers cool, pure, fresh air comfortably, to meet the full needs of the wearer, regardless of the degree of exertion. Breathing is completely independent of surrounding atmospheres. The Scott Air-Pak is always ready. Takes only seconds to go into action. Ideal for industrial routine or emergency operations.

The new Scottoramic Mask gives vision unlimited — wide angle vision in all directions that helps the wearer to spot danger zones quickly for maximum safety.

**Scott Air-Paks can be refilled at a surprisingly low cost. Repair and maintenance costs are lower than other types of self-contained breathing protection equipment.*

On hazardous jobs, Scott Air-Paks help management and labor breathe easier. Send for the Booklet "Scott Air-Paks Save Money, Man Hours and Men for Industry". Write direct or ask your nearest Scott Distributor.

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SAFETY EQUIPMENT DIVISION

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Circle Item No. 17—Reader Service Card

Attitudes and Accidents

—From page 23

where there was more than .1 disabling injury per employee supervised.

In addition to relationships between safety attitudes and accident experience, the study also investigated the possible part that respect-for-authority (attitude toward the law) played in accident experience. It was found the relationship was not significant enough to have influenced the relationship between safety attitudes and accident experience.

Using Attitude Scales

From a practical day-to-day accident prevention and control standpoint, these are things it is possible to do with industrial safety attitude scales. They can be used to:

1. Assess the safety attitude and potential of individual male employees or supervisors, as falling into one of five categories: enthusiastic; good; indifferent; poor; or antagonistic.

2. Determine when and where employee or supervisory safety training is needed.

3. Ascertain the effect of safety programs by before-and-after testing, using the two equivalent forms for employees and the two for supervisors.

4. Make periodic checks for variations in safety attitudes of groups so as to anticipate and offset "safety program fatigue."

5. Obtain leads as to the nature of underlying causes for poor attitude.

6. Appraise the safety potential of employees and supervisors for use as a factor in their promotion and advancement.

7. Stimulate and maintain interest in accident prevention by using test items and responses on an anonymous basis in discussion with individuals or in group safety meetings.

Our subject, "What Makes Us Work Safely," is vital and significant in that it should point to the application of our knowledge in business and industry.

Determination of industrial safety attitudes of individuals and employee groups, and utilization of these attitudes in preventing injuries, is an application which will pay dividends.

Guarding Danger Spots

—From page 39

simple. Control levers of the six blow valves were interlocked, and only one key was supplied. The key fit all six locks.

With this system, an operator who wants to open a blow valve must first obtain a key. But the locks are arranged so the one available key will not be released until the control lever at that point has been locked closed.

To make sure no other key accidentally fits the system, all locks and keys are precision manufactured to adhere to a unique tumbler combination system worked out by a computer.

This system makes it impossible to open more than one valve at a time and makes it impossible for serious accidents to occur when blowing a digester.

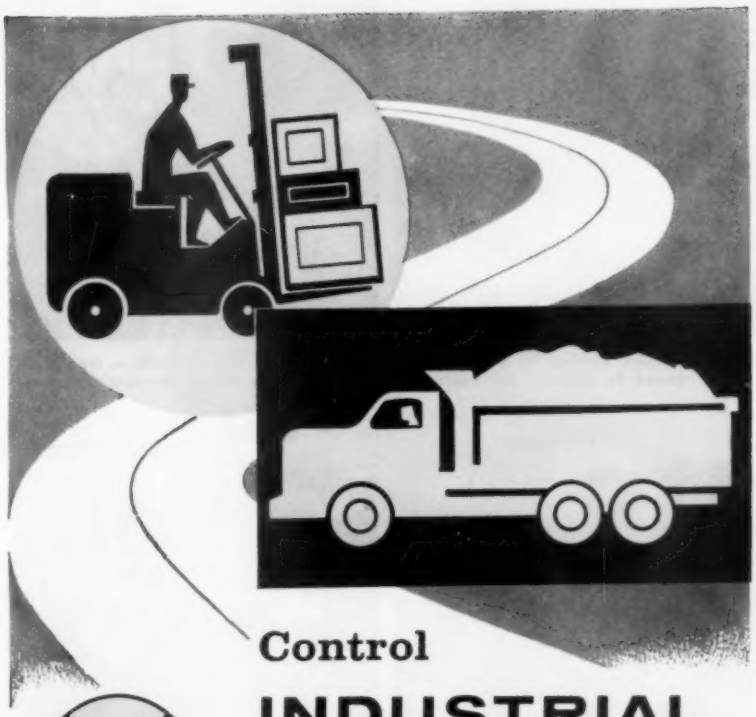
Solvent Handling. The Eastman Kodak Company, Rochester, N. Y., has found key interlocks are vital in many operations and use more than 200 separate installations.

Without interlocking, it is possible for a forgetful operator to run two solvents into the same tank simultaneously, or to run one solvent into several tanks, because he had forgotten to close the tank valves. Misdirection of these solvents could be costly in materials and lost production time. The solvent system was designed and installed with a key interlock system incorporated.

The system developed for Kodak uses a single key, which operates any one of 20 locks on one solvent line. With this system, only one reactor can be open to any one solvent at one time. Here is how it works:

A locked guard is placed over each solvent meter. To set the meter to deliver a predetermined amount of a solvent, the operator must first obtain the key to unlock the meter guard. If no other operator is drawing that solvent, the key will be available at the meter. All valves will be closed, since a valve must be in the closed position before the key can be removed from the lock.

When the operator has the key, the meter guard can be unlocked



Control
INDUSTRIAL
TRAFFIC with
Stonehouse Signs!

Today's vast manufacturing plants have spawned a new and growing hazard, vehicle, pedestrian and rail traffic in and around plant grounds and buildings. Too often, this traffic "just grows". . . is left to shift for itself, without control.

In your plant, play it safe with industrial traffic signs, made for industry by STONEHOUSE. All signs are made of enduring, tested materials, and designed in accordance with American Standard specifications.

Remember . . . nothing costs so little, yet pays off so handsomely, as accident prevention!

* *Write today for our free, full-color, 64 page catalog of thousands of ready-to-ship safety signs, plus information about custom-printed signs to meet your special needs.*

"Signs since 1863"

Stonehouse SIGNS

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Circle Item No. 18—Reader Service Card

1 Gasoline burning for one minute is doused by sprinkler for one minute

2 Two minutes after ignition, foam is discharged through nozzles at side of pan

3 60 seconds later the foam-blanket is completed and fire extinguished

4 Sprinkler water turned off after 4 minutes, leaving a foam blanket through which gasoline vapors could not be re-ignited

A Chemical Foam That Stands Up Under Sprinklers

Now . . . the improved American LaFrance ST unit produces a chemical foam of greater stability that provides a cohesive fire-smothering blanket, regardless of sprinkler water applied before, during or after the foam is discharged.

Incorporating a new protein-base stabilizer, the Foamite Firefoam produced by this new ST unit has an increased expansion ratio up to 35 or 40 per cent . . . considerably greater than ever before. Higher expansion that means a correspondingly higher application rate, thus assuring faster, more positive fire control for industrial hazards, including dip tanks, drain boards, quench tanks and numerous other risks. Water resistance of the new foam banishes the need for plugging sprinkler heads or building water-deflection canopies over high-hazard areas.

Foamite ST units of 10 and 40 gallon capacity are available for use in systems up to 160 gallons capacity that produce uniformly good foam quality throughout discharge.

World's Largest Maker of a Complete Line of Fire-Control Equipment

Write for catalogue 571, showing equipment to fit your every need. Or ask for a factory salesman to call. He will survey your plant for fire hazards. No cost. No obligation.

AMERICAN LaFRANCE

DIVISION OF STERLING PRECISION CORPORATION
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Circle Item No. 19—Reader Service Card

and the meter set to deliver the proper amount of solvent. Before the key can be withdrawn, the guard must be reset over the meter and locked closed.

When the meter is locked, the operator can take the key and unlock the valve for this particular solvent at the valve manifold adjacent to the reactors. To operate any valve in the manifold, an operating lever is required. This lever cannot be removed from any one of the six solvent valves in the manifold until the valve is closed, and the lever can be placed only on the solvent valve for which the operator has the key. This makes certain only one valve in the manifold will be open at one time.

Thus far, the system has assured only one fluid can run into the manifold at a time. Now the operator directs the solvent into the proper tank by taking the key from the individual solvent interlock and opening a valve to one of the reaction tanks.

All valves to the operating tank are closed—they had to be—or the operator could not have obtained the key to the meter. All he has to do is insert the key into the proper tank valve. This allows him to operate the valve to that tank with the valve operating lever. But, when the valve is opened, the key is held and cannot be obtained until the valve is closed. Since the key is needed to set the meter, it is impossible to start another run of solvent until the holding tank is closed and the key released.

Tank Car Loading. A large chemical company had a potentially dangerous condition in one of its Detroit plants. While loading liquid chemicals into tank cars, any bumping of the cars or mixing of the fumes from the chemicals could have meant fire or explosion.

To prevent disaster, the company made a strict rule forbidding more than one car on a loading spur at a time. The rule was observed, but—like most rules—not 100 per cent.

The system installed by R&IE engineers not only prevents more than one car from being on a spur at a time, but also insures all load-

ing valves are closed and the siding is free and properly switched before a loaded car is removed.

The system uses standard interlocks and a derail—a steel shaft placed over a track to assure that no car can pass. The system works like this:

1. The main siding switch must be locked closed before a key can be obtained for the derail.
2. The derail must be locked in place before the key can be obtained to unlock the valves supplying the tank car.
3. After the tank is filled, the valves must be locked closed before the derail key is made available again.
4. The derail must be removed before the switch can be opened to move the car from the loading spur.

Used with Missiles. In the exotic field of missiles, key interlocks are finding many uses. A simple, one-key, two-position interlock is used to prevent a galvanometer from being burned out at the missile test site at the U. S. Naval Depot in Hingham, Mass.

This interlock assures the galvanometer is never connected across its circuit while the circuit is shorted out, and prevents anyone from turning on the galvanometer while the technician is not at the control panel.

During the pre-firing period, a routine check on the missile is made by placing a galvanometer across two wires coming through a protective concrete wall.

After the check is made, the galvanometer is switched out of the line and the circuit is shorted out. If someone were to reconnect the galvanometer across the shorted circuit, it would be burned out.

To connect the galvanometer, a key must be inserted in the interlock and turned. As the key is turned, it opens the shorting contact and closes the galvanometer contacts on the line. In this position, the key cannot be removed.

To disconnect the galvanometer, the key is merely turned back. This closes the shorting contact and opens the galvanometer contacts. In this position, the key can be removed, and the technician can carry it with him to assure no one connects the galvanometer without authorization.

WHATEVER
the JOB . . .
There's a HOOD
Glove that fits it best
Some work gloves have to resist heat. Some should be acid resistant. Others must be anti-slip. Each job makes certain requirements of a glove. That's why HOOD makes 29 different kinds — in rubber, neoprene and plastic. Among them you'll find one that's best for each job in your plant.
Use Hood's famous Glove Guide, with its "wear test" performance chart to choose the right glove for every application. Write to: Hood Industrial Gloves, Watertown 72, Massachusetts.
No. PV-96
Plastic-coated palm. Resists acids, alkalies, oils and abrasion. One of 29 different styles.
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RUBBER • NEOPRENE • PLASTIC INDUSTRIAL GLOVES
Circle Item No. 20—Reader Service Card

FACT: SIGHT SAVERS

Watermarked as your guarantee of genuine SIGHT SAVER quality.

FREE WALL DISPENSERS!

$2.50 value each . . . free with your purchase and continued use of SIGHT SAVERS

- **Strong, heavy-gauge steel . . . pilfer proof.**
- **No waste — delivers just one tissue at a time.**
- **No mess — no liquids, no bottles, no extras.**
- **Never runs out — can be refilled before empty.**
- **Easy to install — compact, only 3½" x 8" overall.**
- **Attractive colors — safety green, white or black.**

have twice the silicone, clean glasses better

Here's what **THIS FACT** means to your eye safety program

It's the silicones on a lens cleaning tissue that do the work . . . and SIGHT SAVERS are treated on both sides with twice as much silicone as other tissues. So, it's a fact . . . you can count on SIGHT SAVERS to do the best job of cleaning and polishing safety glasses . . . and do it without a chance of scratching costly glasses.

More reasons why SIGHT SAVERS are your safest buy

- Nationally advertised; known, preferred and purchased by millions of satisfied users. You don't have to "*sell*" workers on using SIGHT SAVERS . . . your employees are already *pre-sold*.
- Exactly the right size to clean glasses most efficiently . . . economically.
- Endorsed by leading opticians . . . meet Federal specification UU-P-313d for lens cleaning tissues.

NOW *—new lower prices for SIGHT SAVERS . . .*
check with your safety distributor *

first in silicones

Dow Corning CORPORATION
MIDLAND, MICHIGAN

* In Canada, any branch of The Safety Supply Company.

Circle Item No. 21—Reader Service Card

Diary of a Safety Engineer

—From page 12

He hadn't been listening to me, anyway. "There may be something in what you say," he muttered, "but the real problem is they won't listen to me. The foremen laugh behind my back. The workmen won't talk freely. The management group has changed so much that I have few friends left. Even old Johnson won't listen to me—not really. If I was a younger man I'd quit and go somewhere where they really want a safety program, and get away from all this heckling and obstruction."

I was through then, and finally I admitted it to myself. I said a few empty words of vague encouragement, and then I went away. Half an hour later I came back past the spot where we had talked and Jake was still sitting there in the same chair, staring at his feet, his shoulders curved downward like frowning lips, a man alone, living in a past that would not protect him from a demanding present.

It was like a breath of fresh air, when I heard a young voice speak my name and I turned to listen to one of the youngest men in my section—an earnest, half-trained junior safety man still glorying in a long series of great discoveries about safety work that have all been made before. He doesn't know the ideas are old, and since he doesn't know that, and since he moves from one old-new idea to another in rapid succession, he lives in a past-based future of hope and joy.

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Involved are such industries as aviation, chemicals, agriculture, and pulp-and-paper, as well as governmental military agencies. Chlorates and perchlorates are used in matches and pyrotechnics, Jato units, fusees and flares, rockets and missiles, weed-killers and defoliants, paper-pulp bleaching and in other materials and processes.

The chart offers information on substances that may ignite if mixed with chlorates or perchlorates, what types of clothing to wear and how to care for clothing when working with these chemicals, how the chemicals should be handled, stored, shipped, and unloaded.

Copies of the chart may be obtained from the company at 3000 West Sixth Street, Los Angeles 54. Distribution will be restricted to organizations working with these chemicals. Those requesting the chart are asked to identify themselves as to affiliation and the application concerned.

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Joe never was in the pro class, it's true, but he could boast a very low club handicap and went around beautifully under his own power . . . until! A sudden accident at the plant drastically changed Joe's handicap.

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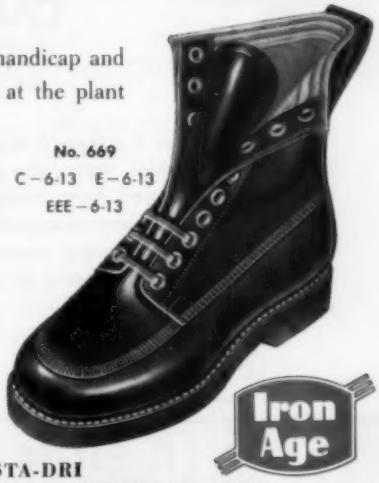

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Circle Item No. 22—Reader Service Card

Industrial Health

—*From page 56*

tial white count, and a chest x-ray.

It may be desirable, depending on possible previous exposures to x-ray or neutrons, to have an eye examination performed by an ophthalmologist. Physical examinations should be given regularly.

Radiation sources must be monitored for radiation exposure intensities by an adequately-trained person with appropriate instruments. Sources that emit penetrating radiation, such as x-ray or gamma rays, require the determination of a safe working distance.

Adequate local exhaust ventilation having appropriate filter media should be used where there is a possibility of breathing radioactive materials. Work surfaces, floors, walls, and other surfaces must be periodically monitored by special instruments to prevent spread of radioactive materials.

Avoid surface contamination by using absorbent paper or strippable coatings on surfaces where spills might occur. Smooth nonabsorbing surfaces are required in equipment, on floors and walls. By wiping surfaces and noting activity on the *wipe sample*, loose contamination can be traced.

Decontamination requires special techniques and materials: synthetic detergents, appropriate solvents, and citric or nitric acids. Vacuum cleaning units, with approved microfilters to prevent air contamination, can pick up radioactive particles.

Air samples, collected and analyzed, will determine the amount of radioactivity present in the working environment. Samples should be taken while work is in progress and at frequent intervals. A periodic check of the effluent from exhaust ventilation should be made. It may be appropriate to obtain soil and vegetation samples at intervals for radioactive analysis.

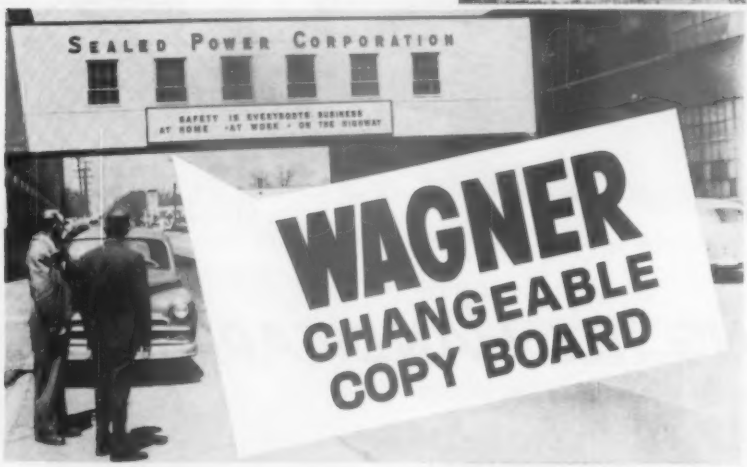
Continuously maintained records of radiation exposures to personnel and visitors are valuable. Photographic film used in film badges to record exposures should be preserved indefinitely. Pencil electrometers or dosimeters can observe amounts of radiant energy before the end of the work period or period of film badge exchange.

Encapsulated sources must be tested periodically to find possible leakage. Ventilation removes air contaminates. If such ventilation is not completely satisfactory, adequate respiratory protection is necessary.

Self-contained breathing equipment should be on hand for conditions other than low-level contaminated air and for highly radioactive airborne materials with long half-lives.

Adequate protective clothing, such as coveralls, gloves, and similar items, can prevent workmen from having their personal cloth-

All It Takes To Make Your Safety Program Effective is a . . .



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on and off the job . . .

HY-TEST
announces the

Industry has a great stake in the Safety of its employees. Injuries mean loss of time, loss of production and unnecessary compensation costs. One out of ten industrial injuries involve feet and toes. It is important to everyone concerned with Safety that the incidence of such injuries be constantly reduced.

To encourage even greater use of Safety Shoes on *and off* the job; to recognize employees who wear Safety Shoes; and to commend those who have avoided serious injury by wearing Safety Shoes, HY-TEST is sponsoring the Golden Shoe Club.

The Golden Shoe Club has been established to review all authentic cases and present an award of recognition and commendation. There are no strings attached.

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Circle Item No. 24—Reader Service Card

ing contaminated. Contaminated clothing must not be sent to a public laundry. Showers and separate lockers for street and work clothes are a necessity.

The federal regulation CFR-10, Part 20, *Standard for Protection Against Radiation,* and various handbooks issued by the National Bureau of Standards can be useful guides.

Wastes are segregated into three categories: flammable radioactive solids, non-flammable radioactive solids, and radioactive liquids. With proper disposal of ashes, and under controlled conditions, it is possible to burn flammable radioactive materials.

Burial by agencies approved by the AEC may be required for other wastes. Extreme care is necessary in seeing contaminated waste materials are properly contained. All containers of radioactive material, wastes, or product, must bear appropriate labels.

Areas containing radioactive materials that can become airborne should be under negative pressure, so air movement is always from low-level to high-level areas. Microfilters may be required for exhausts. Filters require careful checking and monitoring; it is desirable for air to flow through them on a horizontal plane to prevent radioactive particulate matter from falling and contaminating other surfaces.

Specific rooms, vaults, or other facilities should be used for storage of sources and kept locked, with only responsible people having keys. Records must be maintained for materials checked in and out of these well-marked areas.

Close cooperation with local fire departments is important, so the department will be aware of necessary precautions, if it is to aid in fighting a radioactive fire. Dry chemical power is necessary on the premises for use on burning pyrophoric materials. Flammable materials must be well separated from radioactive materials.

Self-contained breathing equipment must be available for persons required to enter areas where fire or other causes may have resulted in contamination of the atmosphere.

Wire from Washington

—*From page 8*

Commerce. (See "Wire," April 1958.)

"I, frankly, am tired of hearing that our drivers are delinquent, alcoholics, and incompetents . . . I was not long in being convinced, on the basis of the evidence we had seen, that Detroit was not turning out the safest possible product," Mr. Roberts said.

He suggested that, if the federal government's purchase specifications prescribed certain safety specifications for its motor vehicles, such safety devices might become standard equipment on all cars.

The ICC admonished truck fleet owners that in truck-leasing arrangements the lessee was responsible for compliance with all of ICC's Motor Carriers Safety Regulations, including those relating to records, hours of driving, and safety equipment.

The ICC issued notice of a proposal to amend these regulations about brakes required on trucks and truck-tractors having three or more axles and on the requirement that all brakes be operative.

The Federal Highway Administrator estimated that motor-vehicle registrations in the United States are expected to reach 68,398,000 for 1958. This 1.9 per cent increase is a continuation of the downward trend of the last few years in such annual increases.

Marine Safety. The Coast Guard's proposed regulations to implement the Federal Boating Act of 1958, to be submitted to the Merchant Marine Council, are scheduled for public hearing December 9. The Coast Guard also amended its regulations relating to the display and visibility of lights required on private aids to navigation.

Aviation Safety. The CAA amended its technical standard orders to relax its minimum performance standards for fire detectors to be used in civil aircraft. The CAA is also continuing experiments with high-visibility paints as a means of avoiding mid-air collisions.

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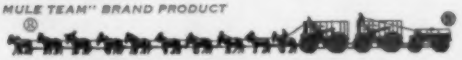

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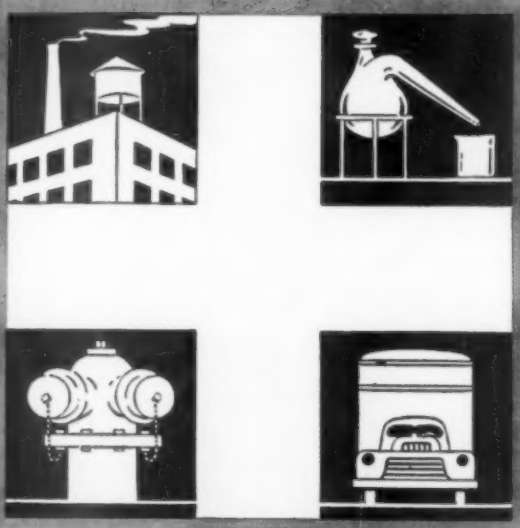
TECHNICAL FEATURE SECTION

The Journal

OF THE AMERICAN SOCIETY OF SAFETY ENGINEERS



NOVEMBER, 1958

In this issue

Our President Speaks on Safety..*49*

Safety Training for Foremen
by D. L. Arm and G. F. Griffin.....*50*

Introduction to Discussion Period
by David L. Arm.....*55*

Prepared Discussions on Safety Training for Foremen
by John A. Dickinson.....*57*
by Edgar N. Goldstine.....*58*
by Thaddeus J. Ostrewich.....*59*
by Fred O. Soughton.....*60*

Nuclear Safety Considerations in the Processing of Fissionable Materials
by Leonard D. Solon.....*61*

Fission and Safety Men

Every day, it seems, the use of nuclear materials by government and private industry becomes more prevalent. Potential hazards are many but to date the safety record is enviable.

Since this atomic age in which we find ourselves still is comparatively young, uses for fissionable substances probably will continue to increase rapidly for many years, accompanied by technological advances in methods of production, handling and storage of these materials.

Any safety engineer may find himself, almost anytime, faced with new accident prevention responsibilities involving problems of radioactivity. If the nation's excellent safety record in this field is to be maintained, it is becoming more and more necessary for all safety men to be well informed.

We feel the Journal should be alert to all opportunities for presenting authoritative information on the subject and, therefore, are most happy to publish, on page 61 of this issue, Leonard R. Solon's basic and valuable article, "Nuclear Safety Considerations in the Processing of Fissionable Materials."

Incidentally, Mr. Solon's career is illustrative of the fact that the atomic age is fast reaching maturity. When he was graduated from Rutgers (with an M.Sc.) in 1949, he immediately took a position as a nuclear physicist. Others with similar experiences form a sizable group of men who have every possibility of spending their entire professional lives in nuclear work.—Editor

AMERICAN SOCIETY OF SAFETY ENGINEERS

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OUR PRESIDENT SPEAKS ON SAFETY

It is helpful to spend a few minutes in self-examination. How often do we sit back and ask ourselves, "What are our responsibilities as safety engineers within our respective companies and are we doing everything possible to fulfill these responsibilities?"

We are expected, through various means, to improve the accident experience of those operations on which we apply our time and energies.

We have a primary responsibility to improve the frequency and severity records. In our efforts to accomplish this, we have a responsibility to our managements to present sufficient facts to "sell" them and secure their much needed backing to make our safety programs truly effective.

We also have a responsibility to all foremen and supervisors to explain our ideas so clearly and enthusiastically that these people will work devotedly on controlling accidents in their respective jurisdictions.

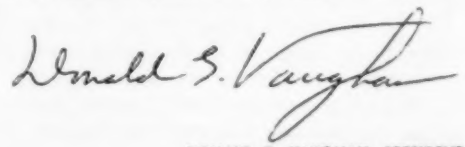
We have a responsibility to the worker to see that he is educated in safe practices. While we are not expected to take on this task with each separate, individual worker, it is our responsibility to see that the proper instructions get down through the organization to each employe. How this is accomplished depends on our channels of instruction, which vary among companies. Basically, however, it is our responsibility to see that the necessary instructions pass along the complete route, from top management to supervisors and eventually to every worker.

We have a responsibility to see that operations are provided with the best possible mechanical safeguards.

We also have a responsibility to see that others in our organization assist us. We can make use of the Personnel Department, the Employe Training Department, the First Aid Department and others. Whatever means we use to accomplish our purpose must depend on the facilities available and our own ingenuity.

How often do we sit back and ask ourselves, "Have we fully discharged all of these tasks?"

In order to accomplish our primary responsibility, have we provided as safe a place as possible for all workers to carry out their respective assignments? Have we used all possible means to see that safety education has effectively permeated all channels from top management to each individual employe? I am sure that, after a few minutes of such reflection, we can find several places where improvements can be made or efforts can be intensified and where we can employ new avenues of approach.



DONALD G. VAUGHAN, PRESIDENT
AMERICAN SOCIETY OF SAFETY ENGINEERS

Safety Training for Foremen

BY DAVID L. ARM AND GLENN F. GRIFFIN

DAVID L. ARM

"Safety Training for Foremen," which is published on the following pages, was one of 12 major papers presented at the Second World Congress on the Prevention of Occupational Accidents, held May 19-24, 1958, in Brussels, Belgium.

The Congress, which had the participation of some 40 countries and 2000 delegates, was aimed at identifying the major problems of occupational safety and considering solutions which have been developed in various parts of the world. A system of simultaneous interpretation was used at the Congress and all proceedings were published in the six official languages of the meeting — Dutch, English, French, German, Italian, Spanish.

In considering its American publication of "Safety Training for Foremen," the Journal found particularly noteworthy the fact that Society member David L. Arm, who represented the National Safety Council at the Brussels meeting, was the only delegate from the entire Western Hemisphere who was scheduled to present a major paper.

Mr. Arm, who became manager of NSC's Industrial Department in 1955, previously was dean of the School of Engineering, University of Delaware, for nine years. He is a registered professional engineer in Pennsylvania and holds a BS and MS in mechanical engineering as well as a professional ME degree. In addition to our Society, he is a member of ASME and ASEE.

The paper which Mr. Arm presented was coauthored by Glenn F. Griffin, NSC's director of industrial training and production of industrial training films. After experience in personnel, training and safety work, Mr. Griffin joined the Council staff in 1935. He has held his present position since 1945.

Since the text of "Safety Training for Foremen" was published and distributed to World Congress delegates before the May 23 session at which it was scheduled, Mr. Arm did not deliver it verbally at that time. Instead, he opened the planned discussion period on the paper with brief introductory remarks, which appear in the Journal immediately following the principal paper.

A number of prepared discussions on "Safety Training for Foremen" were submitted to the World Congress as supplements to the Arm-Griffin presentation. Among these supplementary papers were four written by Society members — John A. Dickinson, Edgar N. Goldstine, Thaddeus J. Ostrewich and Fred O. Soughton — and the Journal also has availed itself of the opportunity to publish these discussions in this issue although it has been necessary, because of space limitations, to condense slightly the original texts.

GLENN F. GRIFFIN

In the United States of America, leaders of business and industry, and the companies they represent, have joined together to promote good programs of accident prevention. During the last 44 years, these efforts have been coordinated through a voluntary association, the National Safety Council. Although they are not forced to do so by stringent laws and regulations set up by governmental units, these business leaders voluntarily conduct excellent programs of occupational accident prevention because they believe that safety is good business. They are convinced that safety for all employes is good business, not only from an economic point of view but for humanitarian reasons as well.

They have learned that good occupational safety programs lead to better efficiency of production, better quality of product and lower costs. In a free enterprise system, these are important considerations since they enable business to make a profit — the incentive for establishing and conducting such enterprises. They also have learned that these programs lead to good employe morale and good community relations. In addition, one of the guiding principles of business management in America is a sincere concern for the health and welfare of all employes. Through good occupational safety programs, this concern finds its best expression.

Foreman's Responsibility for Safety

In American industry, those safety programs which are most successful are the ones where all levels of management not only support but actively participate in their conduct. Safety is looked upon as a function of line supervision and the primary responsibility for accident prevention rests with the foreman.

There are good reasons for placing this responsibility on foremen since they are the members of management who have the closest personal contact with the workers. It is their responsibility to train their men in proper work procedures, to retrain them when necessary, to schedule production and assign work, to check on performance, to watch quantity and quality of production and to keep production costs at a minimum. These supervisors represent all of management to the workers and their efforts have much to do with whether or not good employe morale is maintained. Since safety is such an important factor in production, it is logical that it should be a natural part of the supervisor's duties.

A professional safety man guides foremen in a great many American firms. His normally is a staff position and it is his responsibility to plan safety programs, to keep management advised as to their progress and to assist supervision in matters of accident prevention in every way possible. However, he is not responsible for the day-to-day supervision of safety activities within the various departments of a firm and it is generally conceded that this should not be his function since it is properly a function of the foreman to supervise all activities of all workers under his jurisdiction. A surrender of any part of the supervisory function would weaken the position and the authority of the foreman with the workers.

Objectives of Safety Training for Foremen

Since the primary responsibility for safety of the workers has been placed upon the foreman, a great many American firms give foremen special training in this aspect of their jobs in order to achieve the following objectives:

1. To acquaint foremen with the company's accident policy and program.
2. To establish the status of the foreman as the person responsible for preventing accidents.
3. To get foremen to understand the nature of their responsibilities and the responsibilities of others in the organization.
4. To provide foremen with special information on accident causes and methods of prevention.
5. To give foremen an opportunity to consider current accident prevention problems and to develop solutions.
6. To help foremen gain skills in the activities necessary for accident prevention.
7. To give foremen help in current safety projects in their own departments.
8. To get foremen to participate actively in the planning and conduct of the company's entire safety program.

Basic Courses for Supervisors

To achieve these objectives, foremen often are given formal courses of instruction in accident prevention. Courses of instruction in all aspects of foremanship are rather well known in the United

States. The usual plan is for the foremen to meet in a two hour meeting about once a week for several weeks. Foremen meet in small groups and much of the instruction is done by discussion.

A course in safety for foremen usually follows this same pattern. A list of course subjects recommended by the National Safety Council, and rather generally used, includes:

- Fundamentals of Accident Prevention
- The Foreman's Place in Safety
- Mechanical Safeguarding
- Safety in Materials Handling
- Personal Factors in Safety
- Job Instruction and Supervision for Safety
- Accident Costs and Their Effect on Production
- Causes of Accidents and Basic Methods of Prevention
- Fire Prevention
- Plant Housekeeping for Safety
- Problem People Who Cause Accidents
- Safety Committees and Other Cooperative Activities for Safety

In every company, there is likely to be variation from this list of subjects but the subjects named are the main ones taught.

In those American companies where accident prevention has been most effective, all supervisors are given a basic course of this nature. Also, the course is repeated from time to time for new supervisors and for prospective supervisors.

However, not every American company goes to such lengths. Two difficulties have kept many companies from doing this kind of safety training. First, they often are not able to employ a professional training man qualified to prepare the lesson outlines and teach the course. Second, even if they have employed a professional training man, the amount of time and money it takes to prepare material, particularly the visual training aids such as films and charts, makes such training seem uneconomical.

The National Safety Council has sought to overcome these difficulties by preparing courses with compelte teaching guides for each lesson, an interesting film on the subject of each meeting and detailed instructions for the leader who is to conduct the classes. With these prepared course materials, it is easy for any company to conduct good courses in safety for foremen. American industry has accepted these aids and has used them with a great deal of success.

The first foremen's course using films was offered about 15 years ago. This technique was so successful that many additional films were made, all planned as teaching aids. Now it is possible for a company safety director to select subjects and films for two or three successive courses, or for repeat courses for the same group, without repeating the films.

Another major training aid for foremen has been a work called the *Supervisors Safety Manual,* published by the National Safety Council. This is a 350 page book of 12 chapters covering the safety subjects just mentioned a few moments ago. It is designed to use as a text for a course given to a group or it can be used by a supervisor studying alone. A complete instructor's guide with quizzes, discussion questions and references, lists of suitable training films and other visual aids, has been developed and is in constant use.

Spectacular benefits often result from a supervisor's safety course. Among them are increased understanding of safety, acceptance of responsibility for the prevention of accidents and greater interest in all supervisory duties. A prominent American industrialist, J. E. Trainer, vice president of Firestone Tire and Rubber Company, summed up the effects of safety training when he stated that "in any well organized program, the safety training courses go far beyond the accident prevention field itself and make the supervisory employe a better all-around member of the management team."

Further Methods of Supervisor Education

Personal Instruction—Some further methods of supervisory education are personal instruction by the professional safety man, work projects and safety meetings. Personal instruction and coaching by the safety man have been extremely valuable. Where the safety man and the foreman have met privately to talk over the job, a free exchange of ideas has been experienced that is not possible in a group. In private conversations, foremen have expressed reservations or doubts that they preferred not to voice in a public meeting and thus safety men have been able to clear up misunderstandings.

Foremen appreciate interest in their work and

usually are eager to teach others about the processes in their departments. Safety men, in turn, have learned much from foremen about mechanical processes and also about problems of supervision.

Work Projects—Probably the best kind of safety training for foremen comes when they actually do a job that needs to be done. Small groups of foremen, working with the safety man, implement and augment their company's safety program by undertaking projects for which they are well qualified. Examples of such projects are setting up plant inspection procedures, developing checklists, developing rule books, studying accident costs, and setting up contests. Foremen undertaking such projects often acquire a proprietary interest in the safety program as well as a good deal of skill and factual information.

Foremen's Safety Meetings—Safety meetings for foremen are held periodically in a great many American firms even when no formal training program is being conducted. If the company sponsors regular foremen's meetings to consider general supervisory matters, including safety, special safety meetings are held only three or four times a year. If no other foremen's meetings are held, safety meetings are more frequent, perhaps once a month or once every two weeks.

Programs for foremen's safety meetings sometimes are planned by a Foremen's Committee in cooperation with the Safety Department or by the Safety Department alone. Program subjects commonly presented are the company's accident experience, a talk on some new and interesting aspect of safety, a new safety film, discussion of a particular category of accidents, recommended preventive measures.

Supervisory Skills

We have learned in America that success in safety supervision requires skill fully as much as it requires knowledge and understanding. Basic training courses in the elements of a safety program impart knowledge about safety and create a positive attitude toward safety but they are not enough. Skill in accident prevention by American foremen has come from practice in performing specific safety functions. In those American firms where accident prevention has been most successful, such skills have been developed to a very high degree.

Among the most important safety functions performed by American foremen are (1) giving job instruction, (2) investigating and analyzing accidents, (3) discovering accident costs and (4) resolving problems in safety supervision.

Job Instruction—The first of these, job instruction, is not exclusively a safety measure. Rather, it aims at increasing production efficiency. Nevertheless, good job instruction is so essential to safety that often it is incorporated into the safety program when it is not otherwise being promoted.

Foremen skilled in job instruction train new workers better and in less time than when "breaking in" is casual and unplanned. Able foremen first break a job down into its component parts by going through the job carefully, step by step. A written record is made of what has to be done and why. This report enables the foremen to determine exactly what must be taught.

The foreman goes over the report to be sure that safe working procedures are incorporated into job routine and that hazards are removed or guarded. The finished report then becomes the standard method by which this job is taught and done. Deviations from this standard are easily observed and corrected, and possible hazards are controlled.

One method foremen use in checking for all possible hazards employs a hazard spot card. The card lists hazard "areas": the work place, the machine, materials handling, use of tools, etc. By following the list, a foreman makes a complete safety study of the job.

Investigation and Analysis—A second safety skill that American foremen have developed involves the investigation and analysis of accidents. It is a safety axiom that accident patterns repeat and that a close study of past accidents is a guide toward preventing their repetition. Therefore, our foremen have learned to isolate and identify the causes of accidents in order to permit direct and positive action to be taken to prevent their recurrence. In many plants, all accidents causing injury are investigated, frequently by the foreman because he is the man closest to the job. In some plants, near accidents or noninjury

accidents also are investigated if time and facilities are available.

Discovering Accident Costs—A third safety skill that has been developed is the discovering of accident costs. American foremen are cost conscious because they are expected to run their individual departments profitably. They realize that accident costs within their department are a reflection of their ability to run their department economically. Consequently, they have been motivated toward paying attention to safe operating procedures.

Problems in Supervision—A fourth safety function performed by foremen is safety supervision. Skill in handling problems of safety supervision has not been easy for American foremen to acquire. Many accidents have resulted from workers not following instructions, from jobs not being well planned, from foremen not knowing the problems workmen are encountering and from foremen assuming that workers have more information than they really do have. Accident investigation and analysis has helped foremen in learning how to handle such problems. Even greater progress has been made when foremen have developed skill in human relations.

One method of training foremen in handling safety supervision problems requires them to deal with hypothetical supervisory situations in a role playing (play-acting) demonstration. Other foremen attending the demonstration are invited to criticize a particular foreman's handling of a problem and present solutions of their own. Common faults in handling people thus are revealed.

Policies and Attitudes in Education

The American approach to supervisor education naturally has evolved as a result of many years' experience. Certain policies and attitudes now prevail, some of which are summarized here.

First of all, the person conducting a program of education for foremen should remember a number of facts which experienced educators know. One such fact is that supervisors are adults who may well resent being treated like school children.

The average foreman already is an experienced, successful and busy person who probably knows much more about practical supervision than does the person conducting the safety course. The foreman is intensely aware of and proud of the fact that his job is to get out production. He often is impatient at being asked to do work which takes his attention from that main purpose.

At the same time, the foreman usually reflects the attitude of his immediate superior as to what is important and what can be ignored. If a superintendent lets it be known that he insists upon safety and that he judges his foremen on the safety of their departments as well as on their production, the foremen are likely to give attention to any instruction that will help them operate more safely. This fact is a strong argument for starting safety education at the upper levels of supervision.

Foremen sometimes are difficult students because they will pretend to agree with an instructor's ideas in order to get along while actually believing the ideas to be visionary and impractical. An instructor who merely lectures about safety, week after week, may not encounter any disagreement but the foremen probably will neither change their attitudes nor acquire new knowledge or skill. For learning to take place in a foremen's study group, the members have to think about the subject under discussion as it relates to their own work. They have to raise questions, express their views and report their experiences. When they do these things, the smooth flow of instruction often is interrupted but real results in learning are accomplished. It is much more important for people to learn than it is to cover a specific amount of subject matter.

Training Upper Level Supervisors—Much emphasis in America has been placed upon the training of foremen or first line supervisors. Training in safety also should be given to superintendents and upper level staff people who are in positions of authority over foremen. If these people of higher rank do not have the knowledge of safety and the interest in safety that foremen have, two harmful effects can be expected.

First, foremen will be handicapped because they will not get full support for activities they wish to conduct. Second, foremen naturally will have much less interest in safety since they are guided by the attitudes of their superiors.

Perhaps the best of all arrangements is for upper level supervisors to be trained as instructors so that

they can conduct the classes for first line supervisors. This plan has worked successfully in many companies.

Integrating Safety—In a company which has a formal training program, the director of training and the safety director should work together in the planning of various kinds of safety training activity. Almost everything that is taught about good supervision helps to promote safety. Likewise, practically everything that is taught to promote safety improves supervision in other ways.

In the arrangement of formal courses, safety subjects may be integrated with other instruction on general problems of supervision or one or two safety meetings may be included in the course. The basic course in safety fundamentals probably is given best as a unit, with a training season of 10 to 15 weeks set aside for weekly meetings.

In a company which does not have a planned supervisor training program, the success of safety training very well may lead to a program of training in other aspects of supervision.

A Continuing Program—Safety education for supervisors needs to be a continuing program if it is to accomplish the best results. The program should cover many subjects, presented interestingly and in different ways. A small effort, such as holding a few meetings, may cause foremen to do a better job for a short time but interest will lag if the initial effort is not followed up.

Industrial management is dynamic. Change is continually taking place. New methods and new ideas get attention. To hold its own in this environment of change and progress, safety must not be allowed to become static.

The safety professional who strives constantly to help line supervisors take over direct responsibility for safety in their operations finds the results of his efforts multiplied many fold. He becomes a true leader who gets the job done better, not by extending the scope of his own activities but by helping supervisors assume their natural safety responsibilities.

Introduction to Discussion Period

BY DAVID L. ARM

The following remarks were made by Mr. Arm as a preliminary to presentation of prepared discussions on his and Mr. Griffin's paper at the World Congress session on "Safety Training for Foremen."

In opening the discussion on this paper, I should like to mention some of the reasons why we believe the foreman is so important in any good industrial accident prevention program and why safety training is so important.

First, however, I should like to explain two philosophies in which we believe in the United States of America.

Reasons for Accident Prevention—As we have indicated in our paper, there are two reasons why American business is interested in good programs of accident prevention—humanitarian and economic. We make no apology for either reason.

We sincerely believe in the dignity of the individual and in his rights and privileges as a free human being. Among these is included the right to be protected from injury or death due to accidents. Our thinking is well expressed by the primary rule of the American Telephone and Telegraph Company, which says, "No job is so important or so urgent that we cannot take time to do it safely." I can assure you that this attitude of management toward safety is not unique with this one company but is the attitude of American business management as a whole. The safety of the individual is so important with us that it transcends all other considerations.

The economic reason for good safety programs in our industrial establishments is equally defensible. In our free enterprise system, we not only desire business to make a profit—we expect it. Since this is true, we believe that cutting costs of operation through the elimination of the costs of accidents is a legitimate business practice. We would emphasize, also, that good programs of accident prevention relieve the worker and his family from economic stress. Not only is the worker spared from the suffering which results from injury; he is assured of continuing income from his employment.

Approaches to Safety Programing—Although all levels of management must be interested in and

Introduction to Discussion *Continued*

must accept responsibility for the safety program, the foreman or immediate supervisor of the workers is the key man in any accident prevention program. Outstanding safety records are being built where this is true; where not only is the safety engineer doing a good job but the entire line supervisory staff has assumed its responsibilities; where safety performance is a positive factor in consideration of a supervisor for advancement and increases in salary; where safety is a specific part of each job that is done in the plant.

There are two approaches to the operation of a safety program. One is where the Safety Department has certain supervisory responsibilities. In these cases, unsafe machines are tagged out by safety personnel rather than by line supervision. Safety personnel order the installation of machine guards.

An approach which seems to work better than this, in the plants which have good safety programs, is where the safety personnel do not have supervisory responsibilities but where they attempt to achieve their results through teaching, consultation and advice. In other words, the best programs seem to occur in those places where line supervision actually handles all problems of supervision, including safety.

Aid to Leadership—Why should first line supervision be interested in the latter method as compared with the former? In the first place, this method enables the supervisor to gain a greater acceptance of his leadership from the men whom he supervises. At the present time, competition as to wage rates, security and employe benefits have been largely eliminated in any particular geographic area. What then remains is the attraction of good workers by making a place known as a good place to work.

To be a leader, the supervisor must have the respect of the people whom he supervises. To win this respect, he first must show respect for them. The concern he demonstrates for the safety of the man on the job is a good indication of the respect that he has for his workers. This concern must be sincere and it must be constant. It must be a demonstration of the kind of personal interest the supervisor would have in accident prevention if his own son were working in the plant. Employes won't accept lip service. To win acceptance, the supervisor *really* must want to operate a safe plant and, by the example he sets, must let his people know that he expects them to want the same thing.

Essential to Efficient Operation—Disabling injuries and the so-called minor accidents, multiplied many times in the course of a year, add materially to the total cost of industrial accidents. The more serious accidents simply call attention to the problem. However, every accident interferes with production and anything that slows production and increases costs should be the concern of all supervisors.

Accidents, whether they cause personal injury or only property damage, destroy efficiency. Furthermore, they are symptoms that something is wrong. Accidents stem from lack of control over men, materials and processes, and lack of control indicates inefficient operations.

A high injury rate has a depressing effect on employe morale. Unsafe plant conditions, which contribute to accidents, lead to dissatisfaction and poor job performance on the part of the workers.

On the other hand, real pride and enthusiasm for the job exist in companies and departments that achieve outstanding safety records. Employes have a feeling of loyalty for the company and a sense of security on their jobs.

Good morale is worth a great deal to any company. The foreman who builds high morale among his men is rendering an important service to the business. He is doing the job he was hired to do.

Training Program for Supervisors—For these reasons a program of training in the methods of accident prevention, similar to that which we have outlined in our paper, is important. It would be very difficult for the foreman to learn these things as a result of his experience as a worker and as a supervisor. Accident prevention deals with those incidents which do not occur regularly and are unexpected. These are the exceptional situations which can disrupt greatly the normal flow of production but which can be avoided by firm, competent, sympathetic and alert supervision. The supervisor should be trained properly so that he can give this kind of supervision.

Prepared Discussions on Safety Training for Foremen

BY JOHN A. DICKINSON

John A. Dickinson, chief of the Codes and Specifications Section, National Bureau of Standards, was official representative of the Society at the Second World Congress. In safety work for a half century, Mr. Dickinson is a charter member of the Society and of its forerunner, the United Association of Casualty Inspectors, organized in 1911.

For a number of years, it has been my privilege to serve with Mr. Arm on the Industrial Safety Conference of the National Safety Council. I appreciate the excellent job he is doing in the field of industrial safety.

Greetings from Society—As its official representative, I also bring you greetings from the American Society of Safety Engineers, a professional organization of more than 7,000 members. The Society's relation to the National Safety Council is much the same as the relation of the American Medical Association to the Red Cross. During one of its annual drives, the Red Cross used the motto, "Join the Red Cross—all you need is a heart and a dollar." On the other hand, the American Medical Association is open only to graduate doctors. In much the same way, membership in the American Society of Safety Engineers is limited to professional safety engineers.

Mr. Arm's paper is a most timely one and covers the various factors of foreman training quite adequately. There is, however, one aspect of foreman training which I should like to stress.

Let us consider reasons that a particular man (or woman) is chosen as a foreman. These might be:

1. He is a better or more skilled workman than those he supervises.
2. He knows more about the machines and manufacturing processes generally.
3. He can get along well with his fellow workmen.

Ideally, the foreman should excel in all of these phases but this is not always the case. In any event, he is a foreman because his superiors believe that he is a good production man; i.e., he can see that goods are produced promptly and in adequate volume.

Relation of Safety and Production—Unfortunately, many foremen believe that safety and production cannot go hand-in-hand. Actually, the converse of this is the truth but the true situation is one that sometimes is hard to "sell." The late Sidney J. Williams, for many years a key figure in the National Safety Council, frequently gave talks on the text that "an accident is an indication of poor management."

To take a concrete example, let us suppose that a man handling material on a fork lift truck has a heavy box fall on his foot and, in spite of wearing safety shoes, receives an injury which results in lost time. For every reportable accident from this source, there probably have been 50 or 100 cases where material has fallen from the truck or pallet but no one has been injured. After each one of these spills, time has been taken to replace the material on the truck; the falls may have damaged finished goods or partly finished items. Also, the spill may have blocked other trucks using the same aisle.

Effects of Hazard Removal—The accident may have been due to any one of a number of causes: material carelessly stacked, material piled too high, too great a speed around a corner, rough floors, etc. Whatever the cause, its elimination not only cuts down the particular hazard *but, at the same time, cuts down interruptions to production.*

With proper training, the foreman may be brought to the realization that safety and production do go hand-in-hand; that a reduction in accidents carries with it a bonus of increased production.

Safety training for foremen is an indispensable element in an effective accident prevention program. This training may take a number of forms which may be dependent in some measure upon the particular needs of the instructed, the ability and experience of the instructors and the extent of facilities for instruction.

Construction Industry Problems—While all foremen need to understand general principles of accident prevention, a particular knowledge of safe working procedures is indispensable in some particularly hazardous types of industry—notably lumbering, mining, quarrying and construction. This is due to the wide variety of working conditions and, in some degree, to the instability of the labor force due to irregular employment with the same employers. In these comments, the construction industry will be given specific consideration.

Subjects requiring special attention in construction include excavation, scaffold construction, ladders, handling of materials, use of hand tools, portable power tools, construction equipment, haulage of men and materials, barricades and warning signs, maintenance of good housekeeping, use of personal protective clothing and equipment, demolition, first aid. Some kinds of work also may require consideration of the use of explosives, drilling equipment, pile driving, work under compressed air, diving, etc.

Definite safety standards for approved working methods and conditions need to be developed and utilized. In the State of California many such standards have been incorporated in the recently revised Construction Safety Orders which have the force of law. Beyond these state requirements, other standards without legal status deserve consideration, such as correct methods of lifting and handling material by workers, fire prevention measures, etc.

Effective Training Method—One extraordinarily effective method for safety training of construction foremen, in the writer's experience, consisted of weekly instruction, primarily of one subject each week, about safe methods and conditions and ways for foremen to present this information to the workmen.

This indoctrination was given by the safety engineer in a class period that usually lasted from 30 minutes to an hour each Friday afternoon. An outline of prepared material was given to each foreman, to be used on the following Monday at his safety meeting with his workers, which was held the first 15 minutes of the working day.

BY EDGAR N. GOLDSTINE

Edgar N. Goldstine, consulting safety engineer, completed his BS in civil engineering in 1917. He began his career in the construction industry in which, 10 years later, he entered safety work. He also has had experience in the insurance field. A member of the San Francisco Chapter, he became a member of the Society in 1934.

At the Monday meeting with his men the foreman, in addition to covering the outlined material, also discussed particular hazards and the precautions to be used on the work to be performed during the week by his men. The workers then were invited to submit any questions or recommendations they might have for consideration. Accidental injuries which had occurred and unsafe work practices or working conditions observed were mentioned. Means for covering them were outlined. Blackboards were used to list the subjects and topics to be considered.

A Foremen's Committee was used to inspect portions of the work under their jurisdiction and hazards observed were recorded. If no hazards were observed on any part of the work, all of which was subject to inspection, a Green Cross safety flag was flown for that day at the entrance to the construction area where it could be observed by all employes.

Outstanding Safety Record—In one organization *the effect of this training of the foremen,* who in turn trained the workers (all of whom had been given three lectures, ten days apart, on the working conditions and the methods they were to observe, supplemented by printed and illustrated safe practice instructions), *was to develop a disabling injury record that was close to perfect.* This occurred on a construction operation with more than 500 men which continued for more than a year.

Accident prevention efforts of a similar nature and quality under the direction of competent safety engineers would contribute very much to the prevention of accidents throughout the construction industry—and in all other industries as well.

BY THADDEUS J. OSTREWICH

Thaddeus J. Ostrewich is the executive manager of the Seguridad Industrial A. C. (Industrial Safety Society), which is headquartered in Monterrey, Mexico. Mr. Ostrewich has been engaged in safety work in Mexico and Venezuela, principally in the petroleum industry, for some 22 years. He became a member of the Society in 1947.

The industrialization of Mexico, which is in a state of continuous development, is a significant demonstration of the increasing progress of the country. In many branches of economic activity, new factories are being put up which increase output and give opportunities of work to an ever greater number of workers.

Need for Foreman Participation—It is natural that this remarkable advance opens the road to innovations, either of methods or of the kinds of occupations, tools or manufacturing processes. In order that men may carry out their work safely, it is important that effective supervision by a responsible agent can be relied upon. Under these conditions, the intervention of the foreman becomes a decisive factor in accident prevention.

In dealing with the accident problem, we must consider not only injuries to workers, although this is our primary concern, but also possible damage to machinery, tools and materials, for these damages weigh heavily on the cost of production.

Empty oratory is not enough to sell safety to workers; one must have, and impart, genuine enthusiasm. Accident prevention is an ideal and a duty which one must carry out and it is impossible to do so without the full collaboration of the worker who is conscious of his value and anxious to apply the rules and principles of safety to his daily tasks.

Factors in Job Performance—The foreman should keep in mind that the same factors which contribute to a worker's poor job performance are also the chief causes of industrial waste, such as:

1. Lack of "know how" and of attention in handling both raw materials and finished products.
2. Improper use and maintenance of tools.
3. Improper handling of machines and equipment.
4. Negligence in handling and maintaining machinery.
5. Failure to use proven work methods.
6. Inexperience of workers.
7. Indifference of workers to the value of looking ahead.

If the foreman is to bring to, and keep at, a high level the efficiency of his workers, he must recognize that the prevention of accidents is an integral part of his duties and that he must correct any workers who are at fault.

The foreman must never lose sight of the fact that accidents do not happen by themselves—they are the result of an imprudent act, the existence of a mechanical hazard or both.

Purpose of Investigation—The foreman should seize every opportunity to show the workers that the chief object of investigating accidents is:

1. To avoid a repetition.
2. To detect imprudent methods of work.
3. To find those working conditions which may be hazardous.
4. To stimulate suggestions for improving working conditions.

In order to obtain complete and trustworthy information on accidents, the foreman must convince his men that the purpose of his investigation is not simply to find out who is responsible and take disciplinary measures. Otherwise, the workers will try to cover up the facts to shield anyone at fault.

Success in Supervision—But if the foreman will take advantage of his opportunities to talk with the men under his supervision, he will find his safety efforts becoming more successful because:

1. He will come to know the workers' attitudes.
2. He will learn more easily the art of giving instructions.
3. He will have an opportunity to explain his own safety attitudes to his men.
4. He will be able to work up a feeling of team spirit among the men.
5. His own zeal will increase as his efforts to teach safety begin to show evidence of success.
6. He will be able to appreciate more fully the grievances which his men may present to him and to find solutions to problems before accidents occur.

BY FRED O. SOUGHTON

Fred O. Soughton is training coordinator for the Kimberly-Clark Pulp and Paper Company Ltd., Terrace Bay, Ontario, Canada. He entered safety work in the pulp and paper industry in 1948 and joined the Society in 1951. At the Second World Congress he represented the National Safety Council Pulp and Paper Section, of which he is past chairman.

Safety must be sold for the same reasons that products or politics are sold. And in any selling job the seller must be sold before he can sell well. In industry, the key to the safety selling job is the foreman. His attitudes, actions, convictions and training trigger the attitudes, actions, convictions and training of everyone he supervises. He must be trained well to be effective.

A vital segment of "Safety Training for Foremen" is the prime concept of the importance of safety, so necessary for a foreman as he deals with the accident prevention problem.

Part of Foreman's Job—Essentially, a foreman must think of safety as a component of his general responsibilities. And we must train and retrain him to think and act in these terms. Safety should be designated officially as part of his prime responsibilities, not as something separate, to be dealt with as time permits.

By accepting this principle, any industrial management can set the stage for an effective accident prevention program. Once the principle is established, certain specific guideposts should be set up whereby a foreman learns to deal with safety problems, as they arise, in the same manner that he deals with operating problems.

Standards for Safety—In safety, as in most areas of industrial activity, certain standards must be met. Every foreman should be able to survey his area of responsibility and define the standards he would have maintained. These should embrace equipment, materials and human performance.

1. Equipment standards should incorporate all mechanical guarding needed for safe operation.
2. Materials standards should define the safety factors for materials as well as equipment needed for their safe handling.
3. Standard operating procedures should constitute safe patterns of human activity, to be performed in a certain manner and sequence for a given purpose. Personal protective equipment requirements and proper use should be defined.

A foreman should be sure that everyone he supervises is well acquainted with these standards. For training and retraining, regular briefing sessions should be scheduled.

Continual conformance with the established standards should be the target of each foreman for himself and his staff. Regular checks should be made and nonconformance dealt with promptly.

Checklist of Acts and Conditions—A foreman should be taught to look for substandard safety situations and performance under two general headings: unsafe acts and unsafe conditions. Checklists should be developed; for example:

1. *Unsafe acts*—not working according to established procedures; working at unsafe speeds; not using equipment safety devices; using unsafe equipment; being in unsafe location; not using the personal protective equipment specified.
2. *Unsafe condition*—poor guarding; poor lighting; defective equipment or materials; improper arrangement of materials or equipment; poor ventilation.

Well developed lists, coupled with established standards, would constitute a substantial manual of basic safety information for any foreman. By developing this material for his own work area, a foreman actually is involved in self-training, which has considerable merit in itself.

When work injuries occur, adequate use of the written investigation technique, with recommendations for corrective action, can be helpful. A foreman is thereby able to determine, in general, the reasons behind equipment, materials or man failures and often is able to prevent recurrences. It also is advisable to consider investigating near injury cases and mishaps involving no person if it seems that corrective action could be recommended.

Support from Management—One other factor merits emphasis in this discussion. Part of the process of "Safety Training for Foremen" must involve foreman realization that he has full backing by his superiors in his efforts to reduce accident causes. Only as such support is assured will the foreman be able to work at accident prevention with conviction —the kind of conviction that will permeate his efforts to do an effective selling job and thereby measurably reduce work injuries.

Nuclear Safety Considerations in the Processing of Fissionable Material

BY LEONARD R. SOLON

CONTEMPORARY nuclear technology, including the operation of power or research reactors and the production of radioisotopes, depends upon an isotope of uranium which is only 0.7 per cent of naturally occurring uranium. Intimately connected with uranium is the isotope plutonium-239, which does not occur for practical purposes in nature.* Plutonium-239 is derived from the abundant isotope of uranium (uranium-238), which in a nuclear reactor captures an excess neutron, becoming in the process the beta emitting isotope of uranium (uranium-239) and then, by two successive beta disintegrations, becoming first neptunium-239 and then plutonium-239.

For purposes of this discussion, another isotope which is capable of sustaining a nuclear chain reaction is uranium-233, which is not derived from naturally occurring uranium but is related to the natural and relatively abundant isotope of thorium in the earth's crust, thorium-232. Uranium-233 is obtained from thorium-232 in much the same way that plutonium-239 is obtained from uranium-238. First, neutron capture in thorium-232 forms thorium-233, which then decays by two successive beta disintegrations to form, first, protactinium-233 and then uranium-233. The latter has not yet achieved the importance of uranium-235 or plutonium-239 as fuel for a nuclear chain reaction.

Plutonium appears in trace quantities as a consequence of neutron capture in U-238. The source of these neutrons is spontaneous fission in natural uranium and (alpha, n) reactions in light elements.

One of the special aspects in the processing or storage of fissionable material is the possibility, however remote, that through carelessness, ignorance or accident a chain reacting or critical configuration may be achieved inadvertently. *Nuclear safety* is the prevention of the formation of an accidental critical configuration in the processing or storage of fissionable material.

Evaluation of Risk

Before discussing some of the considerations which enter into nuclear safety or criticality control, it perhaps is advisable to orient ourselves in the coordinate system of total technological risk, in order to understand better the magnitude of the nuclear safety problem. To establish this orientation, attention should be called to several facts.

1. It is public knowledge that the United States contemplates making available to the International Atomic Energy Agency some 5,000 kilograms or 11,000 pounds of uranium, enriched to 20 per cent uranium-235. This is mentioned to illustrate that fissionable material is not a rare or unusual commodity. It is in fact a commodity which, for more than a decade now, has been produced in such substantial quantities that, over and above the requirements of the United States, more than five tons of it can be made available to an international agency. One can deduce, in general, that fissionable material, at least in the form of uranium-235, exists in substantial and important quantities.
2. The other important fact, in orienting ourselves in the considerations of nuclear safety,

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TABLE I

Critical Mass for Fissionable Materials

Material	Mass (gms)	Volume (liters)	Cylinder Diameter (in.)	Slab Thickness (in.)	Concentration (gm/liter)
U-235 (90% enriched)	800	6.3	5.0	1.4	11.6
U-233	588	3.5	4.0	0.5	10.9
Pu-239	509	5.0	4.5	1.5	7.8

Nuclear Safety Considerations *Continued*

is that there never has been a criticality accident in a production or fabrication operation involving fissionable material—either in the enrichment of naturally occurring uranium-238 or in the fabrication of enriched uranium or plutonium-239*. This does not say that there have not been inadvertent critical assemblies or criticality accidents. There have been both. In fact, in the Atomic Energy Commission program the only two fatalities associated with radiation injury occurred early in the program and were the result of criticality accidents. However, both of these fatalities resulted from experimentation, in which men deliberately were approximating a chain reacting situation, and neither fatality had anything to do with the preparation, storage or fabrication of these materials.

When these two points are considered together, it becomes clear that nuclear safety or criticality control is not an enormously difficult job.

When one contemplates the relative ease with which a chain reacting assembly can be made, the relatively large scale operations involving the processing, storage and transportation of special nuclear materials, and the comparative newness of nuclear technology, those of us who have certain responsibilities in the area of nuclear safety sometimes are impressed with this extraordinary record. With increasing knowledge and confidence in the handling of special nuclear material as more people become qualified in this field, it is to be hoped that this enviable record will be maintained.

The Fission Chain Reaction

One does not have to be a nuclear physicist to understand, in general, what is involved in the prevention of a nuclear accident. There are certain basic concepts which can be understood by technically trained plant personnel. When these concepts are communicated to persons engaged in special nuclear material fabrications, the necessary restrictions which are imposed upon such fabrications are understood and more readily implemented.

We begin by first considering the fission process:

The uranium-235 nucleus consists of 92 protons and 235 minus 92 (or 143) neutrons. When an additional neutron enters the uranium-235, a nucleus is formed in a configuration of great instability, with the result that the nucleus so formed divides or fissions into two nuclei of roughly equal mass. But in addition to these two nuclei, there is a surplus of two or three "left over" neutrons. This is the central phenomenon in all nuclear technology. If a suitable distribution of uranium atoms is made, one of these surplus neutrons can be captured by a neighboring nucleus of uranium-235, which in turn can experience fission. Thus, one can achieve the fission chain reaction or chain reacting assembly.

The business of the reactor designer is to effect neutron economy in such a way that conditions for a chain reaction are most readily realized. On the other hand, it is the function of the person responsible for nuclear safety, in processes involving fissionable material, to see that the chain reaction is not realized in storage or fabrication.

In general, nuclear safety is achieved by limiting the mass or concentration in a particular place or by designing processing apparatus, shipping containers or storage facilities so that the geometry for fission is unfavorable. Subsequent paragraphs will discuss general considerations which are pertinent in the planning of the processing, shipping or storage of such materials.

Solutions, Chips, Shavings and Sludges—A critical configuration which involves the smallest quantity of fissionable material generally consists of finely dispersed material in a hydrogeneous moderator,

**At the time of publication, it was learned that the first criticality accident in a processing plant occurred at Oak Ridge on June 16, 1958.*

such as water or almost any organic material. For this reason, particular attention should be given to processes involving scrap solutions, chips, shavings and sludges containing water, cutting oils or degreasing agents.

Total Flooding—The possibility of an operating area or storage vault becoming totally flooded with light water should not be carelessly excluded. A fabrication operation or a storage vault, which is properly designed from the viewpoint of nuclear safety, should not constitute a critical configuration even if totally inundated by water.

Double Batching—Allowance should be made for the possibility of operating personnel bringing together twice the recommended amounts of fissionable material.

Concurrent Unlikely Events—In general, a nuclear safety program should be planned so that at least two concurrent unlikely events must occur before fission can result. This latter criteria for nuclear safety perhaps can be illustrated best by an example:

The minimum critical mass for uranium-235 in an optimum dispersion in ordinary water is approximately 800 grams. It follows, therefore, that if one were to maintain 400 grams of uranium-235 powder in a container and that if this 400 grams of powder were to be transported from one area in a plant to another, no conceivable contingency of dispersion could give rise to a nuclear accident.

Uranium powder being a pyrophoric material, it is possible that, as a result of a fire, the uranium could be dispersed in a volume of water. One sees that, for a critical configuration to arise, two unlikely contingencies would have to occur simultaneously; namely, double batching of the prescribed limit of 400 grams of uranium-235 powder and the dumping of uranium-235 into water.

It is clear that safety planning much beyond this would become prohibitively costly with no significant increase in protection.

Basic Nuclear Safety Information

As we have indicated earlier, the presence of a hydrogeneous substance such as water or mineral tends to reduce the quantity of fissionable material required to sustain a nuclear chain reaction. The reason is something like this:

When a neutron is liberated by a fissioning uranium atom, it is given up with a substantial amount of kinetic energy or, to express it more colloquially, it has a high speed. The probability of its being captured by an adjacent uranium atom is substantially improved if it is slowed down. It can be slowed down best by colliding with a particle which has very nearly the identical mass. You can visualize this simply. A golf ball bouncing off a basketball loses, essentially, only a tiny fraction of its energy or is slowed down very little but a golf ball colliding with another golf ball can lose a sizable fraction of its energy. In fact, in a single interaction, it can lose all of its energy.

In a very similar way, the neutron is slowed down most effectively by its collision with the proton which is the nucleus of a hydrogen atom and has essentially the same mass as the neutron. Thus, the slowing down or the moderation of fission neutrons is effected best by hydrogeneous materials.

Dixon Callihan has published an unclassified digest of nuclear safety as it pertains to solutions of fissionable materials (Table I of this article).*

It should be made very clear that the values furnished in Table I apply to aqueous solutions of

*Callihan, Dixon. *"Nuclear Safety in Processing Reactor Fuel Solutions,"* Nucleonics, *XIV, No. 47 (July, 1956), p. 39.*

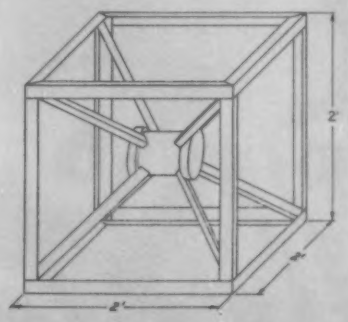

Figure 1—Typical birdcage cubical framework of rigid steel members. Container holding fissionable material is positioned in center of configuration to insure that material never can be closer than two feet from next storage package. Thus, if safe quantity is placed in each container, practically indefinite number can be stored in all directions. Birdcage is designed to withstand significant shock so that, in event of transportation accident or other similar disaster occurrence, integrity of physical shape of birdcage would be maintained.

light water in proximity to materials common in ordinary processing plants: water, concrete, stainless steel, etc. Sizable quantities of beryllium, graphite heavy water—i.e., those materials which are superior to light water for the production of a chain reaction—are understood not to be present.

Particular caution is indicated with respect to the volume, cylinder diameter and slab thickness dimensions. These are applicable only to homogeneous solutions of the fissionable element having a density of less than one gram per cubic centimeter in the fissionable element. For example, the minimum critical slab thickness for uranium-235 in the form of metal in a water bath is *considerably less than the 1.4 inches listed.*

Handling of Massive Metal

In the handling of massive metal the following will serve as an approximate guide:

A solid unreflected sphere of uranium-235 would be critical with a mass of approximately 50 kilograms. If it is totally reflected with light water, the critical mass is reduced by a factor of about two. Total or infinite water reflection is effected with about six inches of light water. Thus, in the form of massive metal, 20 kilograms of uranium-235 with sufficient physical separation from other assemblies can be stored with perfect nuclear safety, even allowing for inundation.

Practical use is made of such storage arrangements in so-called birdcage configurations. These are rigid iron frames in the center of which can be positioned a safe quantity of fissionable material in such a way that proximity closer than two feet, center to center, from other fissionable material is physically prevented. Such configurations are safe, essentially, irrespective of the number of birdcages that are stored side by side.

One question sometimes asked by persons processing normal isotopic uranium is what limitation, if any, is there on the quantity of normal uranium that can be processed in any single quantity. All experiments to date indicate that natural uranium cannot be made critical by use of light water moderation alone, so that for practical purposes no quantity of normal isotopic uranium constitutes a nuclear safety hazard.

Conclusions

In concluding these remarks, it should be pointed out that nuclear hazards simply are an addition to the total technological risk that industry already has taken and that, in relation to this total risk, criticality hazards certainly are not inordinately significant. Like any other industrial risk, a balance must be arrived at, based upon economic requirements and plant safety.

In the fabrication of special nuclear materials, sizable quantities may be processed wholly consistent with the requirements of industrial safety, as is manifested by more than a decade of incident-free operation.

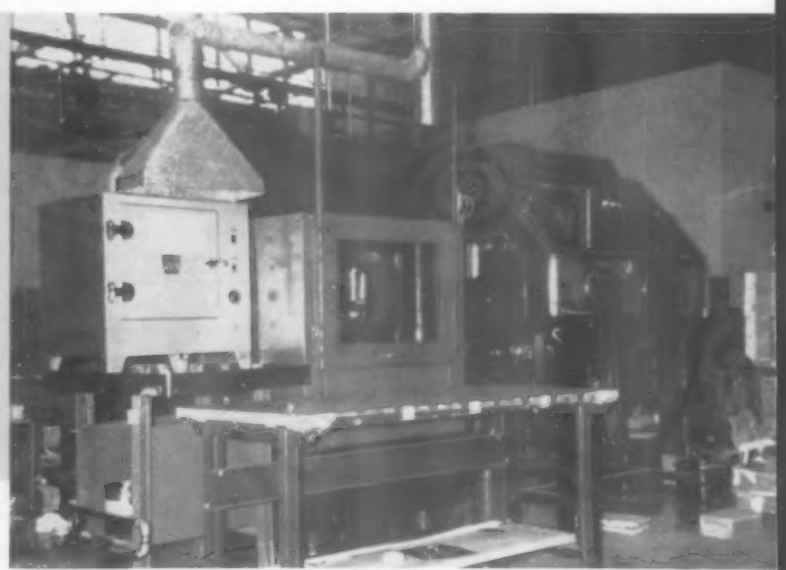

Figure 2—Typical equipment for production and handling of enriched powder. Notice size of equipment, made necessary by limitations imposed on quantity by nuclear safety considerations. Oven, at left, is protected by exhaust ventilation port above door opening and further protected against spillage by means of stainless steel tray in which oven is set. Press, at center, is completely enclosed, with door in front, and is ventilated through rear and side with further exhaust connections. Glove box, at right, also is exhausted.

INDEX TO VOLUME III

JOURNAL OF THE AMERICAN SOCIETY OF SAFETY ENGINEERS

References are to volume number and page. Page numbers in the various issues are as follows: pages 1-16, February, 1958 (Number 1); pages 17-32, May, 1958 (Number 2); pages 33-48, August, 1958 (Number 3); pages 49-64, November, 1958 (Number 4).

A

Accentuate the Positive. *III:21*
Accident Statistics: *see Statistics*
Annual Meeting, 1957: *Standardization in the Field of Nuclear Energy. III:2*
Are Disabling Injury Frequency Rates Valid and Reliable Measures? *III:9*
Arm, David L., *author. III:55; with Griffin, Glenn F. III:50*
Atoms: *see Nuclear Energy*

B

Baltzer, A. M., *author. III:31*

C

Challenges for safety engineers, *editorial. III:17*
Color Coding: *Energy in Color Benefits Plant Safety and Maintenance. III:5*
Congress, Second World, address, 1958: *Safety Training for Foremen. III:50*
Contests: *see Programs*

D

Definition of safety profession, *editorial. III:33*
Device, Ladder Safety. *III:12*
Dickinson, John A., *author. III:57*
Disabling Injury Rates: *see Statistics*
Discussion of Safety Training for Foremen: *Introduction to Discussion. III:55; Prepared Discussions. III:57-60*
Donoghue, Thomas R., *author. III:5*

E

Editorials:
Juli, John F., (technological progress and safety) III:1; (challenges for safety engineers) III:17; (definition of the safety profession) III:33
Vaughan, Donald G., (responsibilities of safety engineers) III:49
Energy in Color Benefits Plant Safety and Maintenance. *III:5*

F

Fission: *see Nuclear Energy*
Flammable Liquids in Industry, Safe Handling, Use and Storage of. *III:24*
Foremen, Safety Training for. *III:50; Introduction to Discussion. III:55; Prepared Discussions. III:57-60*
Frequency Rates: *see Statistics*

G

Glass, Impact Test on. *III:34*
Goldstine, Edgar, N., *author. III:58*
Griffin, Glenn F., *author with Arm, David L. III:50*
Grimaldi, John V., *author. III:9*

H

Handling, Storing and Using LP Gas, Safety in. *III:37*
Handling, Use and Storage of Flammable Liquids in Industry, Safe. *III:24*
How Valid Are Statistics on Small Business? *III:31*

I

Impact Test on Glass. *III:34*
Introduction to Discussion of Safety Training for Foremen. *III:55*

J

Juli, John F., *editorials. III:1, 17, 33*

L

Ladder Safety Device. *III:12*
LP Gas, Safety in Handling, Storing and Using. *III:37*

N

Naquin, Arthur J., *author. III:18*
Need for a Theoretical Framework in the Study of Accidents. *III:45*
Nuclear Energy:
Nuclear Safety Considerations in the Processing of Fissionable Materials. III:61
Standardization in the Field of Nuclear Energy. III:2
Nuclear Safety Considerations in the Processing of Fissionable Materials. *III:61*

O

Ostrewich, Thaddeus J., *author. III:59*
Our President Speaks on Safety: *see Editorials*

P

Patterson, Morehead, *author. III:2*
Pippin, C. A., *author. III:34*
Plant Safety and Maintenance, Energy in Color Benefits. *III:5*
Ponton, Grover W., *author. III:37*
Positive, Accentuate the. *III:21*
Prepared Discussions on Safety Training for Foremen. *III:57-60*
President Speaks on Safety, Our: *see Editorials*
Processing of Fissionable Materials, Nuclear Safety Considerations in the. *III:61*
Profession, definition of the safety, *editorial. III:33*
Programs:
Accentuate the Positive. III:21
Safety Suggestion System Aids Safety Program. III:18

R

Radiation: *see Nuclear Energy*
Rates: *see Statistics*
Research: *Need for a Theoretical Framework in the Study of Accidents. III:45*
Responsibilities of safety engineers, *editorial. III:49*
Rockwell, Thomas H., *author. III:45*

S

Safe Handling, Use and Storage of Flammable Liquids in Industry. *III:24*
Safety Device, Ladder. *III:12*
Safety in Handling, Storing and Using LP Gas. *III:37*
Safety Training for Foremen. *III:50; Introduction to Discussion. III:55; Prepared Discussions. III:57-60*
Scoring system for plant contest: *Accentuate the Positive. III:21*
Second World Congress address, 1958: *Safety Training for Foremen. III:50*
Small Business, How Valid Are Statistics on? *III:31*
Solon, Leonard, D., *author. III:61*
Soughton, Fred O., *author. III:60*
Standardization in the Field of Nuclear Energy. *III:2*
Statistics:
Accentuate the Positive. III:21
Are Disabling Injury Frequency Rates Valid and Reliable Measures? III:9
How Valid Are Statistics on Small Business? III:31
Study of Accidents, Need for a Theoretical Framework in the. *III:45*
Suggestion System Aids Safety Program: *III:18*

T

Technological progress and safety, *editorial. III:1*
Temple, Fred R., *author. III:21*
Testing: *Impact Test on Glass. III:34*
Training for Foremen, Safety. *III:50; Introduction to Discussion. III:55; Prepared Discussions. III:57-60*

V

Vaughan, Donald G., *editorial. III:49*

W

Wolff, Charles S., *author. III:12*
Woodworth, Miles E., *author. III:24*
World Congress, Second, address, 1958: *Safety Training for Foremen. III:50*

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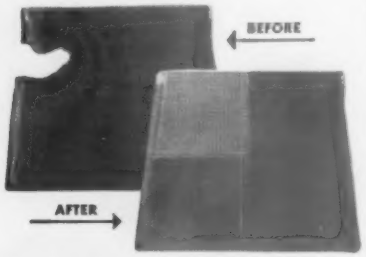

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Safe Design and Use of Industrial Beta-Ray Sources. Handbook 66, National Bureau of Standards. Prepared by the Subcommittee on Sealed Beta-Ray Sources of ASA Z54 Sectional Committee under sponsorship of the National Bureau of Standards. 1958. For sale by the Superintendent of Documents, Washington 25, D. C. Price 20 cents.

THE NATIONAL SAFETY COUNCIL highly recommends this handbook, which contains information on safe design, manufacture, installation, use, maintenance, and disposal of beta-ray sealed sources for industrial applications.

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—E. L. ALPAUGH

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Aeronautics

Design Manual on Aircraft Electrical Installations. Prepared by Airworthiness Requirements Committee, Aircraft Industries of America, Inc., National Standards Association, 616 Washington Loan & Trust Bldg., Washington 4, D. C. 1958 87pp. $1.50.

Chemistry

The Encyclopedia of Chemistry (Supplement). George L. Clark, Editor. Reinhold Publishing Corp., 430 Park Ave., New York. 1958. 330pp. $10.

Occupational Safety

Proceedings of The President's Conference on Occupational Safety, March 25-27, 1958. U. S. Department of Labor, Bureau of Labor Standards, Washington 25, D. C. Bulletin 196.

Health

Fever in Animals and Man in Iowa. R. A. Tjalma. Institute of Agricultural Medicine, State University of Iowa, Iowa City, Iowa. August 1958. 48pp. Bulletin No. 3

Mines

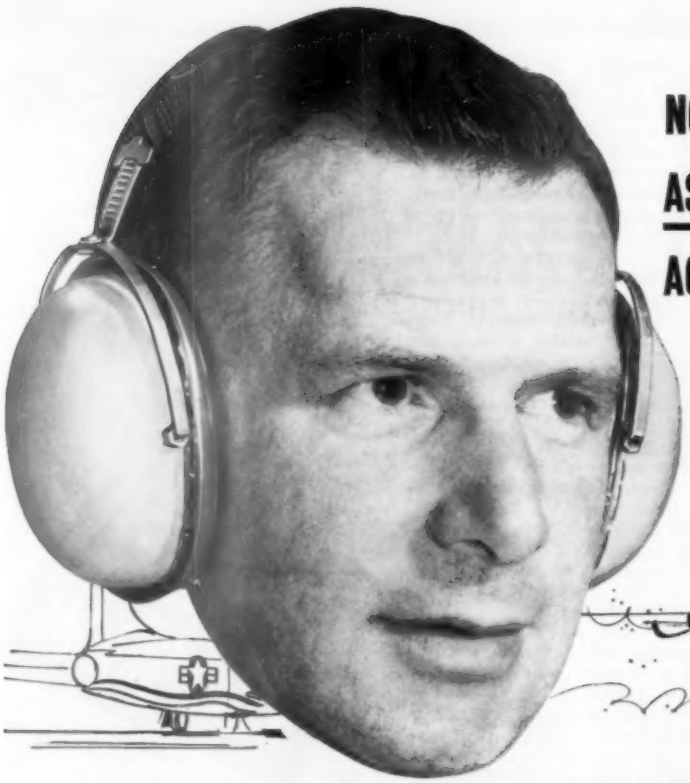
Accidents From Falls of Roof and Coal in Bituminous Coal Mines. Superintendent of Documents, Washington 25, D. C. 1958. 141pp. Miners' Circular 48. (Coal Mine Accident Prevention Course—Section 2.)

Chemical Solidification of Soil in Tunneling at a Minnesota Iron Ore Mine. U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. 1958. 8pp. Information Circular 7846.

Coal Mine Ventilation Without Doors to Control Main Air Currents. U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. 1958. 13pp. Information Circular 7853.

Fire-Protection System, Allen Coal Mine, Colorado Fuel and Iron Corporation, Stonewall (P. O. Weston),

—To page 110



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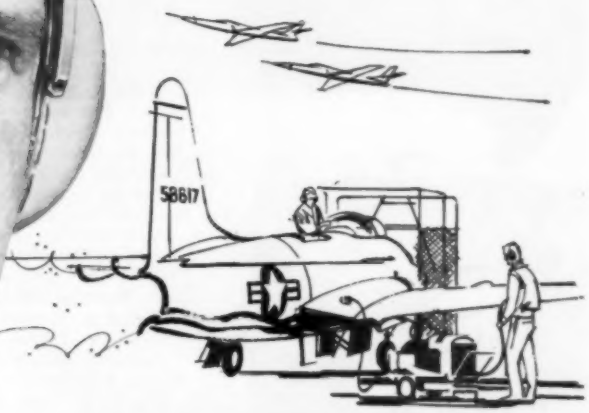

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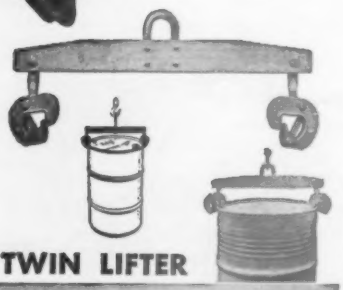
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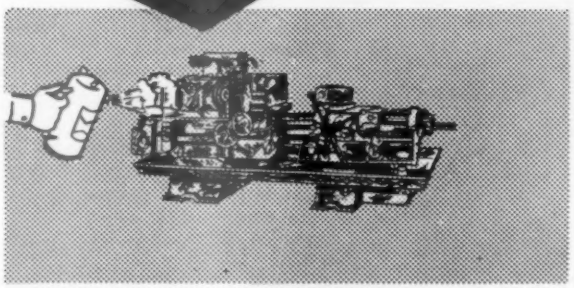

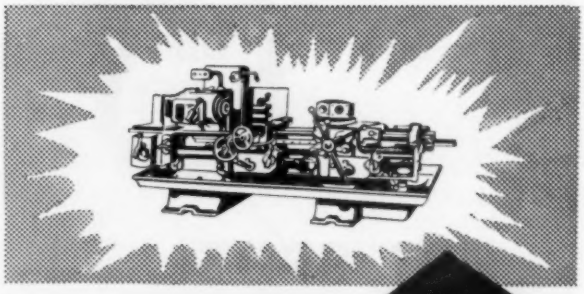

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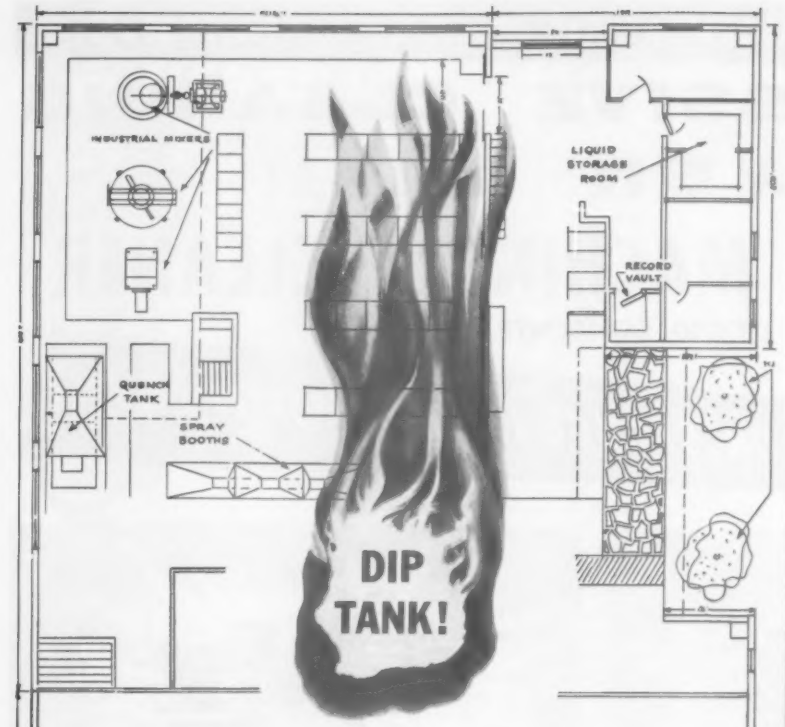
LOOK for the PAX ROOSTER and the PAX SEAL. The hallmarks of superior cleaning products for over thirty years.



HOT SPOT in your plant?

Guard dip tanks, spray booths, record vaults against the danger of fire! Guard them 24 hours a day with a Kidde fully-automatic carbon dioxide fire extinguishing system. Finest fire protection on the market today, Kidde systems give you these outstanding features that come from more than thirty years' experience!

All operating parts completely enclosed to guard against fouling or accidental operation.

No clumsy triggering methods or falling weights.

Self-contained; no outside power needed.

Visual indicators to show if system has been operated.

Easy testing of all operating parts.

No parts to replace after operation or test.

Fast-acting, clean carbon dioxide does the job that no other extinguishing agent can do: snuffs fire out in seconds, then vanishes into thin air. Won't harm valuable machinery, leaves no mess to clean up. Write for Kidde's pressure operated carbon dioxide fire extinguishing systems booklet today.

Kidde (K Kidde) **Walter Kidde & Company, Inc.**
1145 Main St., Belleville 9, N. J.

Walter Kidde & Company of Canada Ltd., Montreal — Toronto — Vancouver

Circle Item No. 32—Reader Service Card

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Cleo F. Craig, member, executive committee, American Telephone & Telegraph Co., New York.

Walter J. Cummings, chairman, board of directors, Continental Illinois National Bank and Trust Co., Chicago.

Harlow H. Curtice, former president, General Motors Corp., Flint, Mich.

Ned H. Dearborn, president, National Safety Council, Chicago.

Richard R. Deupree, chairman, board of directors, Procter & Gamble Co., Cincinnati, Ohio.

J. Doyle DeWitt, president, The Travelers, Hartford, Conn.

Morse G. Dial*, president, Union Carbide Corp., New York.

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Frederick W. Ecker, president, Metropolitan Life Insurance Co., New York.

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Ray D. Murphy, chairman, The Equitable Life Assurance Society of the United States, New York.

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Sherburne Prescott, Belle Haven, Greenwich, Conn.

Gwilym A. Price*, president and chairman, Westinghouse Electric Corp., Pittsburgh, Pa.

Walter P. Reuther*, vice president, American Federation of Labor-Congress of Industrial Organizations, Detroit, Mich.

W. S. S. Rodgers*, former chairman, The Texas Co., New York.

Edward L. Shea, chairman, Ethyl Corp., New York.

Herbert E. Smith, former chairman, United States Rubber Co., New York.

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Arthur E. Stoddard, president, Union Pacific Railroad Co., Omaha, Nebr.

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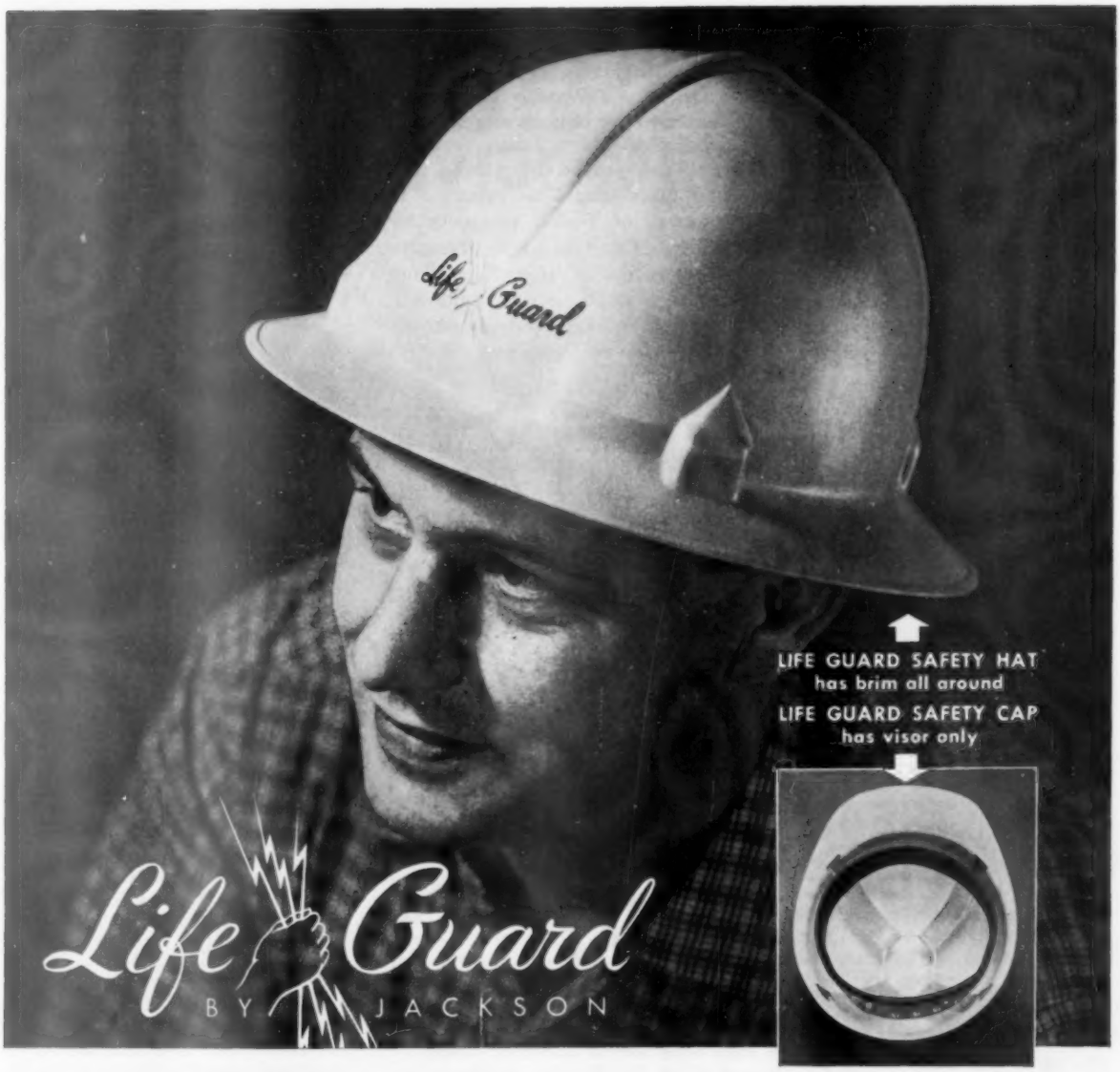
Juan T. Trippe, president, Pan American World Airways System, New York.

C. E. Wilson, Birmingham, Mich.

Robert W. Woodruff, chairman, finance committee, The Coca Cola Co., Atlanta, Ga.



To ELECTRICAL WORKERS, these all-plastic Safety Hats and Caps offer top protection, comfortable wear, and attractive appearance.

They surpass the requirements of the Edison Institute specifications AP-1-1954, resist far in excess of 20,000 volts under electrical tests, thus providing an exceptional safety margin.

What's more, the LIFE GUARD also passes the requirements of Federal Specification GGG-H-142b for construction workers' hats and is therefore recommended as a superior ALL-PURPOSE SAFETY HAT.

The *Hat Shell* is smooth inside, without hazardous and uncomfortable projections. It is made of a specially developed injection molded plastic.

The *Headgear Assembly* combines great strength with comfortable flexibility for better cushioning of impact. Headband and crown straps are molded in one piece of a special polyethylene plastic, soft but non-absorbent, combined with a soft-backed, leatherette-finished sweatband, all around the head. It is the fastest and easiest headband to adjust, and clearly marked in hat sizes. The headgear straps may be wiped clean while attached to the hat or the entire headgear can be removed, easily and without tools, for complete cleaning and sterilizing.

The Safety *Hat* has full brim all around, the *Cap* has visor in front, narrow brim at the sides and back. Both LIFE GUARDS are made in white, yellow and grey.

A *Chin Strap* is optional. Made of colorful, high quality elastic webbing, with smooth, napped cotton inside, it has plastic fittings to adjust and attach to the headgear.

Manufacturers of Jackson Fiber Glass Safety Hats and Welding Helmets, Welding and Chipping Goggles, Eye and Face Shields. Also Cap-and-Helmet, Cap-and-Goggle, Hat and Face Shield Combinations.

For Arc Welding: Electrode Holders, Cable Connectors, Splicers and Lugs.

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Circle Item No. 33—Reader Service Card

Study Disposal of Radioactive Wastes

The nuclear industry will not have to halt its development because of a lack of safe disposal facilities, according to scientists at the Second United Nations International Conference on Peaceful Uses of Atomic Energy at Geneva, Switzerland.

Disposal of high-level radioactive wastes by solidifying methods would have certain advantages, and such techniques are now under study. However, Dr. A. Goldberg of Israel pointed out cost problems in this method.

Dr. L. C. Watson of Canada discussed use of glass as a suitable solid with which fission products could be merged and stored. He said glass would be resistant to removal of fission products by water, offered a simple inexpensive process of conversion from liquid to solid, is easy and economical storage with minimum future control, and provides resistance to radiation or chemical damage.

The Canadian method for producing glass-containing fission products would add an estimated 0.01 mills per kw to the cost of power and a similar amount for permanent storage cost. Use of this system would need 5 to 50 acres of disposal ground per year at a level of 1,000 mw power generation.

United States and Belgian scientists, in describing methods for disposing of high-level radioactive materials in solid forms, said that although tanks so far had proved safe (65 million gallons of liquid wastes are stored in the United States today), tanks demand a high degree of control, and their resistance to time was not yet known. The tankage system should be regarded as a stop-gap method, and safety would increase with conversion of these liquid wastes into storable solids, the scientists said.

Experiments have been conducted with concentration and cooling leading to solidification, adding Portland cement, using clays and clay flux mixes, brown-coal or lignite, salt calcination and the so-called "fluid-bed calcination," described by Dr. C. E. Stevenson of the United States. The latter method is now being developed at the National Reactor Testing School of Idaho.

Dr. J. A. Lieberman of the United States described dumping of radioactive wastes in deep seas and urged more research in this field, including in oceanography the constant control of waste dumps and a "safety first" attitude. The United States has been unable to detect any radioactivity relatable to the sinking of 10,000 curies in specific places in the Atlantic and Pacific Oceans from 1946-57, scientists said.

Daily output of radioactive effluents at Marcoule, France, was from 150 to 200 cubic meters, Dr. C. Bernard reported. Although these effluents (made of chemical separation and laboratory process waste waters and of waters from decontamination washings) were of low average specific activity, it was found necessary to provide treatment before discharging them into the Rhone river.

Eliminate expensive "slips" with

ALCOA ABRASIVE TREAD PLATE

An employee slips on greasy metal flooring, injures his back. Medical costs run up to $523.77. Workmen's Compensation is $1,313.30. Additional claims may be as much as $2,000 more. The employer's accident rate is up and production is down while another worker is trained.

This is just one of the 20,000 expensive slipping accidents which kill or injure industrial workers each year. Most of them can be prevented. Alcoa® Aluminum Abrasive Tread Plate remains slip-proof even when wet, oily or greasy. Made of tough particles of fused aluminum oxide, its hard, abrasive surface is the only nonskid floor plate that gives you the advantages of lightweight, corrosion-resistant aluminum.

For more information on how you can eliminate hazardous conditions from floors, stairs, ramps and other areas, check the coupon below; write Aluminum Company of America, 1671-K Alcoa Building, Pittsburgh 19, Pa., or call your nearest Alcoa distributor.

Sure-grip Alcoa Abrasive Tread Plate is the best insurance you can buy against slipping accidents.

ALCOA ALUMINUM

Your Guide to the Best in Aluminum Value

Make Your Own 30-Second Safety Test . . . Send the Coupon for FREE Sample of Alcoa Abrasive Tread Plate.

ALCOA THEATRE
Fine Entertainment
Alternate Monday Evenings

Aluminum Company of America
1671-L Alcoa Building, Pittsburgh 19, Pa.
I'd like to see how Alcoa Abrasive Tread Plate prevents slipping. Please send me FREE sample—also application, design and fabricating data.

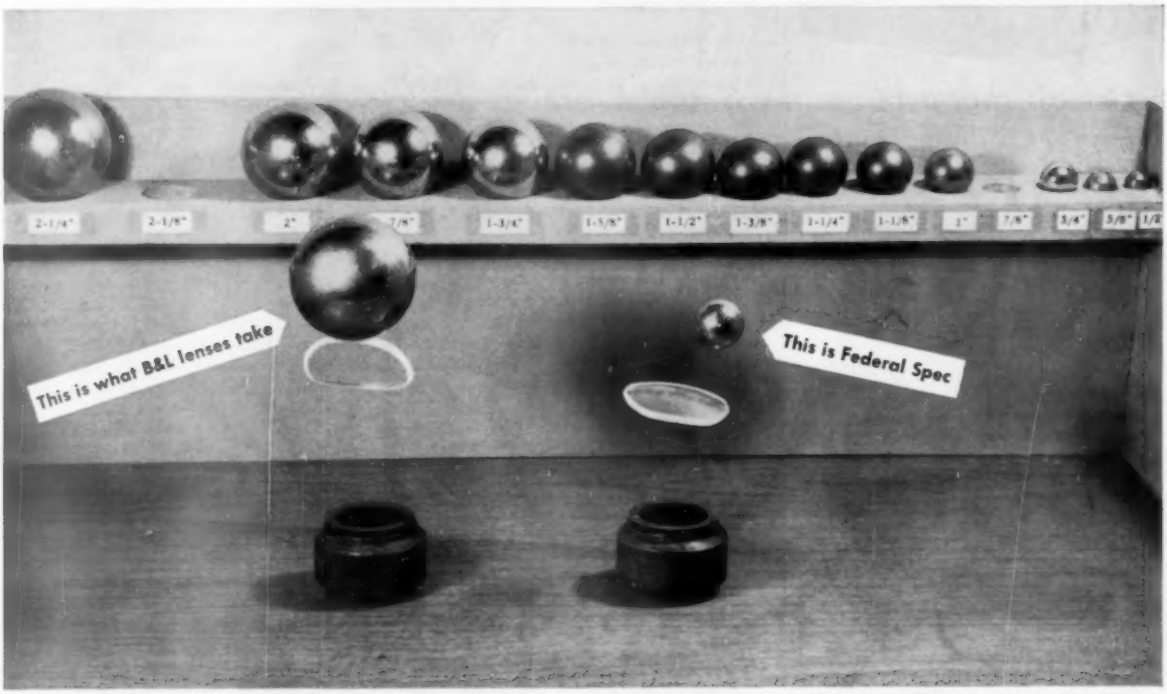
Name and Title .....

Address .....

City and State .....

Circle Item No. 34—Reader Service Card

B&L Bal-SAFE lens takes blow 14 times heavier than "standard"



Here you see two bouncing steel balls stopped in mid-air by the magic eye of the high speed camera. The balls were dropped simultaneously from a height of more than four feet on a pair of B&L Bal-SAFE safety lenses.

There's a story in this picture . . . but it's not in the photography. It's in the fact that a B&L Bal-SAFE lens, on the average, takes a blow 14 times heavier than that required by Federal specification. The larger ball in the photo represents a force 14 times greater than the small ball. (See chart below).

Eye accidents strike like lightning. Quicker than reflex can set up defense, the impact comes . . . fom hurtling object or particles . . . and grave, costly eye injury may result. How much protection do your workers get against it?

The U. S. Bureau of Standards says a safety lens must withstand impact of 0.4122 foot pounds. The test is commonly made by means of a 7/8 inch steel ball dropped from a height of 50 inches. Most makes of safety lenses are thus tested. All must meet Federal specifications. But these specifications do not suggest the measure of safety above and beyond the minimum . . . such as the measure in Bal-SAFE lenses.

Through recent technological improvements, B&L toughens Bal-SAFE lenses—from a minimum of 5—to an average of 14 times the accepted standard. It costs you nothing extra, but it gives you so much extra—in protection for your workers' eyes, in security for the corporate purse.

For details on Bal-SAFE lenses and full line of B&L PROTECTION—*PLUS* Safety Eyewear, ask your distributor of B&L eye safety products.

KINETIC ENERGY OF STEEL BALLS

Ball Dia.		Weight Grams	Weight Pounds	Ratio To 0.50" Ball	Striking Energy 50" Drop Ergs.	Ft. Pounds	
1/2"	0.500"	8.5	0.01874		1.058 x 10^4	0.0780	
5/8"	0.625"	16.6	0.03660	1.953	2.092 x 10^4	0.1542	
3/4"	0.750"	28.0	0.06173	3.294	3.486 x 10^4	0.2571	
7/8"	0.875"	44.9	0.09898	5.282	5.590 x 10^4	0.4122	A
1"	1.000"	66.8	0.14726	7.859	8.317 x 10^4	0.6133	
1 1/8"	1.125"	94.9	0.20921	11.165	11.815 x 10^4	0.8713	
1 1/4"	1.250"	130.3	0.28726	15.329	16.347 x 10^4	1.2055	
1 3/8"	1.375"	173.5	0.38249	20.412	21.601 x 10^4	1.5930	
1 1/2"	1.500"	225.1	0.49625	26.482	28.025 x 10^4	2.0667	B
1 5/8"	1.625"	286.1	0.63073	33.658	35.620 x 10^4	2.6268	
1 3/4"	1.750"	351.6	0.77513	41.365	43.774 x 10^4	3.2282	
1 7/8"	1.875"	435.6	0.96032	57.247	54.232 x 10^4	3.9994	
2"	2.000"	529.7	1.16644	62.247	65.886 x 10^4	4.8588	
2 1/8"	2.125"	634.9	1.39969	74.694	79.157 x 10^4	5.8376	C

A Federal spec for impact resistance, B B&L minimum, C B&L average.

BAUSCH & LOMB
SINCE 1853

Circle Item No. 35—Reader Service Card

It's a fact!

Slips and falls cause 20,000 DEATHS, over 2,000,000 INJURIES each year.*

Get all the facts on modern floor care in this free booklet!

If you have extensive floor areas to maintain, you need this booklet.

It shows you how to improve safety through *proper* floor care. It contains a complete and impartial discussion of the kinds of maintenance material best suited for use on various types of floors . . . from the point of safety and appearance.

*National Safety Council

Send for your FREE 32 page floor care booklet today

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Branch Offices in Principal Cities In Canada: Toronto, Ontario

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76 Roland Street, Boston 29, Mass.

☐ Send me free, your new floor care booklet, "What Every Executive Should Know About This Vital Thousandth of an Inch".

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NS-118

Circle Item No. 36—Reader Service Card

COMING EVENTS

in the safety field

Nov. 3-6, New York

Third National Industrial and Building Sanitation Maintenance Show (New York Trade Show Building.) Leonard S. Rogers, Orkin Expositions Management, 19 West 44th St.. New York 36.

Nov. 5, Fort Worth, Tex.

Fourteenth Annual Industrial Institute. Sponsored by Fort Worth Safety Council (Hotel Texas) and Fort Worth ASSE.

Nov. 5-6, Columbia, S. C.

1958 South Carolina Accident Prevention Conference. Fred Derrick, Jr., sec.-treas., South Carolina Industrial Commission, P. O. Box 539, Columbia, S. C.

Nov. 6-7, Chicago

Lead Hygiene Conference (Drake Hotel). Attendance limited. Manfred Bowditch, director of health and safety, Lead Industries Association, 60 East 42nd Street, New York.

Nov. 11-13, Miami Beach, Fla.

Twenty-eighth Annual Meeting of Institute of Traffic Engineers (Deauville Hotel). David M. Baldwin, executive secretary, 2029 K St., Washington 6, D. C.

Nov. 28-Dec. 5, San Francisco, Calif.

Annual Meeting of American Association of State Highway Officials (Sheraton-Palace Hotel). AASHO, National Press Building, Washington 4, D. C.

Nov. 30-Dec. 5, New York

American Society of Mechanical Engineers, Annual Meeting (Statler and Sheraton-McAlpin Hotels). ASME, 29 W. 39th St., New York 18.

Dec. 8-9, New Orleans, La.

Lousiana Safety Association Conference and Exhibit (Roosevelt Hotel). Charles E. Doerler, P. O. Box 1148, Shreveport, La.

Jan. 22-23, Milwaukee, Wis.

Seventeenth Mid-Winter Occupational Safety Conference and Exposition (Hotel Schroeder). R. W. Gillette, executive director, Wisconsin Council of Safety, 1 W. Wilson St., Madison, Wis.

Jan. 26-29, Cleveland

Tenth Annual Plant Maintenance and Engineering Show (Public Auditorium.) Clapp and Poliak, Inc., 341 Madison, New York.

Jan. 28-30, Berkeley, Calif.

Eleventh California Street and Highway Conference (University of California). Institute of Transportation and Traffic Engineering, U. of California, Berkeley, Calif.

Feb. 5-6, Los Angeles

Ninth Annual California Statewide Governor's Industrial Safety Conference (Biltmore Hotel). Michael Flagg, conference coordinator, 965 Mission St., San Francisco.

Mar. 4-5, Philadelphia

Twenty-fifth Annual Regional Safety and Fire Conference and Exhibit (Bellevue-Stratford Hotel). Harry H. Verdier, executive director, Safety Council, Chamber of Commerce of Greater Philadelphia, 121 South Broad St., Philadelphia.

Mar. 16-17, Boston

Thirty-eighth Annual Massachusetts Safety Conference and Exhibit (Hotel Statler Hilton). Bruce Campbell, manager, Massachusetts Safety Council, 54 Devonshire St., Boston 9, Mass.

Mar. 17-18, Fort Wayne, Ind.

1959 Northeastern Indiana Safety Conference and Exhibit. Ivan A. Martin, manager, Safety Council, Chamber of Commerce of Fort Wayne, Fort Wayne, Ind.

Mar. 23-25, Los Angeles

Sixth Annual Western Safety Congress and Exhibits (Ambassador Hotel), Los Angeles.

April 5-9, Cleveland, Ohio

1959 Nuclear Congress (Cleveland Auditorium). Engineers Joint Council, 29 W. 39th St., New York, N. Y.

April 8-10, Gainesville, Fla.

Sixth Annual Conference on Accident Prevention Engineering (University of Florida). Donald B. Wilcox, conference coordinator, University of Florida, Gainesville, Fla.

April 13-17, New York

Twenty-ninth Annual Safety Convention and Exposition (Hotel Statler). Paul F. Stricker, executive vice president, Greater New York Safety Council, 60 E. 42nd St., New York 17.

"You won't be here long enough to worry about the second two rules, son, if you don't pay attention to the first."

Feel like you need these?

Looking for safe footing on ice? Then try Wyandotte ZORBALL! Because its angular particles provide maximum skid resistance, ZORBALL assures safe traction on steps, ramps, driveways, loading platforms . . . wherever ice presents a hazard.

ZORBALL is a sure cure for slipperiness inside the plant, too. It absorbs oil, grease, water, *any* liquid. It holds up under heavy traffic without mudding, caking or dusting . . . and remains effective more than twice as long as ordinary floor absorbents. The reason is the structural strength of the product: ZORBALL WON'T BREAK DOWN!

There are Wyandotte ZORBALL jobbers in all principal cities in the United States and Canada. ZORBALL is readily available. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California. Offices in principal cities.*

Wyandotte CHEMICALS

REG. U. S. PAT. OFF.

J. B. FORD DIVISION

Circle Item No. 37—Reader Service Card

U. S. Fire Losses Reach New Peak

Fire losses in this country reached the highest point in history last year.

Destruction of almost $1,280,000,000 worth of property in more than 2,000,000 fires was recorded in 1957, according to an analysis just completed and published by the National Fire Protection Association. This was an increase of about $48,350,000 more than in 1956, and the third year in a row that record-breaking totals have been registered.

Fire damaged or destroyed 530,000 dwellings in 1957, causing a loss of about $276,250,000. Both figures are new highs, representing an increase of 6,500 in number and $16,250,000 in dollar cost from the previous year.

Damage to all buildings was up $52,115,000, to a total of $1,068,115,000, with 843,900 structures involved. A $24,540,000 increase in manufacturing plant losses and the rise in dwelling losses were partly responsible for the increase.

There were an additional 1,181,600 fires not involving buildings—principally aircraft, motor vehicles, forest, ships, rubbish and grass fires—which accounted for an estimated $211,811,000 loss.

Among building fires, there was a marked decrease—$18,450,000—in warehouse losses. Hospital and other institution losses declined about $2,934,000. Schools and colleges recorded a drop of $2,625,000 in losses.

Aircraft fires numbered 200 in 1957, a decline of 50 from the previous year. Losses were $115,000,000 compared with $130,000,000 in 1956. Motor vehicle fires were also down, from 173,500 to 160,000, and losses declined from $18,600,000 to $17,200,000.

Topping the list of building fire causes is smoking and matches. These were responsible for starting an estimated 130,800 fires in 1957, doing $71,900,000 worth of damage.

Other principal causes were: defective or overheated cooking and heating equipment—117,900 fires, $112,900,000 damage; electrical—113,500 fires, $162,000,000 damage; rubbish, ignition unknown—62,400 fires, $21,108,000 damage; flammable liquids—50,200 fires, $37,785,000 damage; defective or overheated chimneys and flues—37,000 fires, $31,150,000 damage; children and matches—38,500 fires, $19,000,000 damage; and lightning—29,800 fires, $29,757,000 damage.

All causes registered increases over the previous year, except for two. Lightning fires in buildings declined by 15,400, with a corresponding decrease of $5,783,000 in losses. Fires caused by electrical wiring and other fixed services decreased by 1,900 in number and $10,480,000 in loss.

The complete report of "Fire and Fire Losses Classified, 1957" appears in the *NFPA Quarterly* of October 1958. Reprints of the analysis are available from NFPA Publications Department, 60 Batterymarch Street, Boston 10, Mass., at 25 cents a copy.

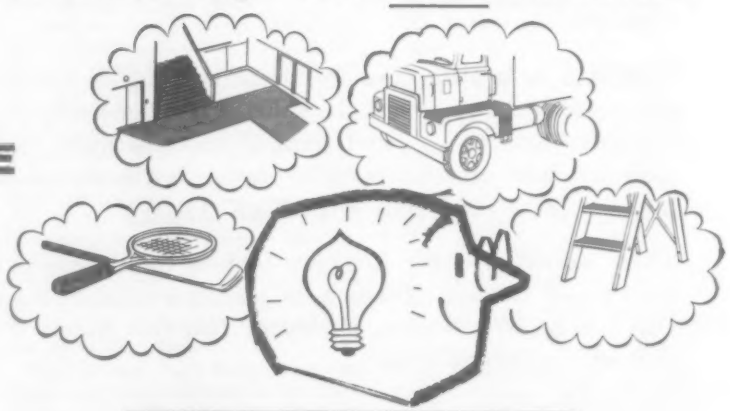
If you don't think women are explosive—just drop one.

Education: that which discloses to the wise and disguises from the foolish their lack of understanding.—*Ambrose Bierce.*

3M introduces

"SCOTCH-TRED"...amazing new IDEA material

- **VERSATILE**
- **DURABLE**
- **DECORATIVE**



New resilient non-slip surfacing discovery! Versatile "SCOTCH-TRED" is soft, pliable, conforms to almost any surface or contour. Uses for this extra long wearing protective material are everywhere. Carpet quiet, tile tough, "SCOTCH-TRED" combines beauty with safety. Available in rolls, squares, strips . . . three beautiful colors: black, gray, beige.

Write on your letterhead for free sample and full information to 3M Co., Dept. RM118, St. Paul 6, Minn.

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Resilient NON-SLIP SURFACING

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. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

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ACCO Registered® Wire Rope Slings

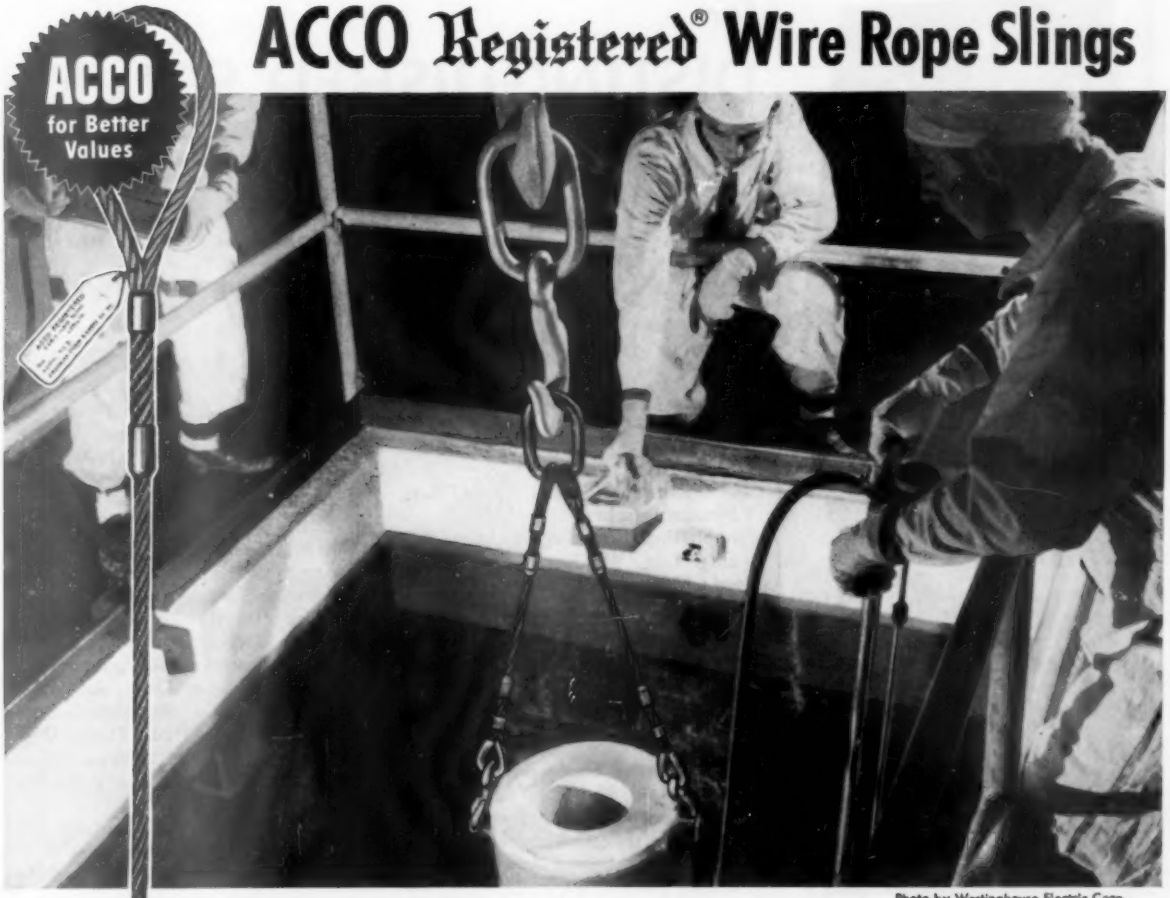

Photo by Westinghouse Electric Corp.

STAND BY—Radioactive Material Below!

The safe handling of this load of radioactive material rests in the hands of irreplaceable scientists and technicians. They've been given the safest and most modern handling equipment available to do their job—including ACCO *Registered* Wire Rope Slings.

Chances are the lifting of your product does not require the services of skilled "hot lab" technicians. Nevertheless, your rigger is also a skilled technician who shares heavy responsibility in the daily production of finished products or assemblies worth thousands of dollars. He is also entitled to the best tools available for doing his job, as is any other workman in your plant.

And the best slings you can give him are ACCO *Registered* Wire Rope Slings. Each is a precision-made tool that offers the modern patented wire rope ending—DUALOC. See box at right for other features these great slings give you.

FREE 52-Page Catalog No. 9—contains helpful information about strengths, weights, dimensions—also prices—of ACCO *Registered* Wire Rope Slings. Write our Wilkes-Barre office today.

WHAT "ACCO REGISTERED" MEANS

1. The best material
2. Unit safety factor (on bodies, rings, links, hooks)
3. Proof test of complete sling to twice the working load limit
4. Actual field service test of each design
5. Metal identification tag on each sling
6. Signed Registry Certificate with each sling

ACCO AMERICAN CHAIN & CABLE COMPANY, INC.
WIRE ROPE SLING DEPARTMENT

Wilkes-Barre, Atlanta, Chicago, Denver, Houston, Los Angeles, New York, Odessa, Tex.
Philadelphia, Pittsburgh, Portland, Ore., San Francisco, Bridgeport, Conn.
In Canada • Dominion Chain Company Ltd., Niagara Falls, Ontario

Circle Item No. 39—Reader Service Card

national's fast, safe SS-25 for electrical cleaning

National's SS-25 is the SAFE, FAST solvent for cleaning and degreasing all electric and electronic equipment. SS-25 has no flash at the boiling point, and its low toxicity is 25 times safer than carbon tetrachloride. With a specific gravity of 1.03, SS-25 leaves no residue on drying. Your electrical equipment will have a longer, trouble-free life when cleaned with National's economical SS-25 Solvent Degreaser. SS-25 should be specified wherever a SAFE solvent degreaser is required. SS-25 is registered in the U. S. Patent Office.

A PRODUCT OF NATIONAL RESEARCH

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DISINFECTANT COMPANY
2417 Commerce, Dallas
906 S. Seventh, St. Louis

Circle Item No. 40—Reader Service Card

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DISTINGUISHED SERVICE

Winners of National Safety Council Awards for outstanding records

AWARD OF HONOR

Belden Mfg. Co., Richmond, Ind., Plant No. 3.

The Chemstrand Corp., Nylon Plant, Pensacola, Fla.

Combustion Engineering, Inc., Nuclear Div., Windsor, Conn., Plant.

Ford Motor Co., Central Office, Dearborn, Mich.

General Electric Co., two awards: Fuels Preparation Dept., Richland, Wash.; Tell City, Ind., Tube Plant.

B. F. Goodrich Co., Martha Mills, Thomaston, Ga.

Hawaiian Commercial & Sugar Co., Ltd., Central Shops Section, Puunene, Maui, Hawaii.

Hughes Aircraft Co., Emery Park Station, Tucson, Ariz.

Radio Corporation of America, Lancaster, Pa., Plant, Electron Tube Division.

Westinghouse Electric Corp., East Pittsburgh Division.

AWARD OF MERIT

ACF Industries, Inc., Nuclear Products, Erco Div., Albuquerque, N. M., Plant.

American Can Co., two awards: Houston, Tex., Plant 42-A; Newark, N. J., Machine Shop.

British American Oil Co., Ltd., Prairie Div., Saskatchewan & Alberta, Canada.

California Texas Oil Co., Ltd., Caltex Oil Refining (India) Limited, Visakhapatnam, Refinery.

Citizens Gas & Coke Utility Co., Indianapolis, Ind., Plant.

Curtiss-Wright Corp., Electronics Div., Carlstadt, N. J.

Ford Motor Co., five awards: Frame Plant, Metal Stamping Div., Dearborn, Mich.; Long Beach, Calif., Assembly Plant; Power & Utility Services, Dearborn, Mich.; Styling Office, Dearborn, Mich.; Wixom Plant, M-E-L Div., Novi, Mich.

General Electric Co., four awards: Home Laundry Dept., Louisville, Ky.; Portable Appliance Dept., Allentown, Pa., Plant; Range Dept., Louisville, Ky.; Service Shops Dept., Cleveland, Ohio, Apparatus Service Shop.

National Lead Co., Titanium Div., Sayreville, N. J., Plant.

National Lead Co. of Ohio, Feed Materials Production Center, Fernald, Ohio.

Radio Corporation of America, Semiconductor & Materials Div., Somerville, N. J.

RCA Service Co., Missile Test Project, Patrick Air Force Base, Fla.

The Ruberoid Co., Minneapolis, Minn., Plant.

Tennessee Eastman Co., Kingsport, Tenn., Plant.

Well Surveys, Inc., Tulsa, Okla.

Western Electric Co., Inc., five awards: Telephone Sales Div., Installation: Albany, N. Y.; Chicago; Denver; Detroit; and Washington, D. C.

Westinghouse Electric Corp., Small Motor Div., Lima, Ohio.

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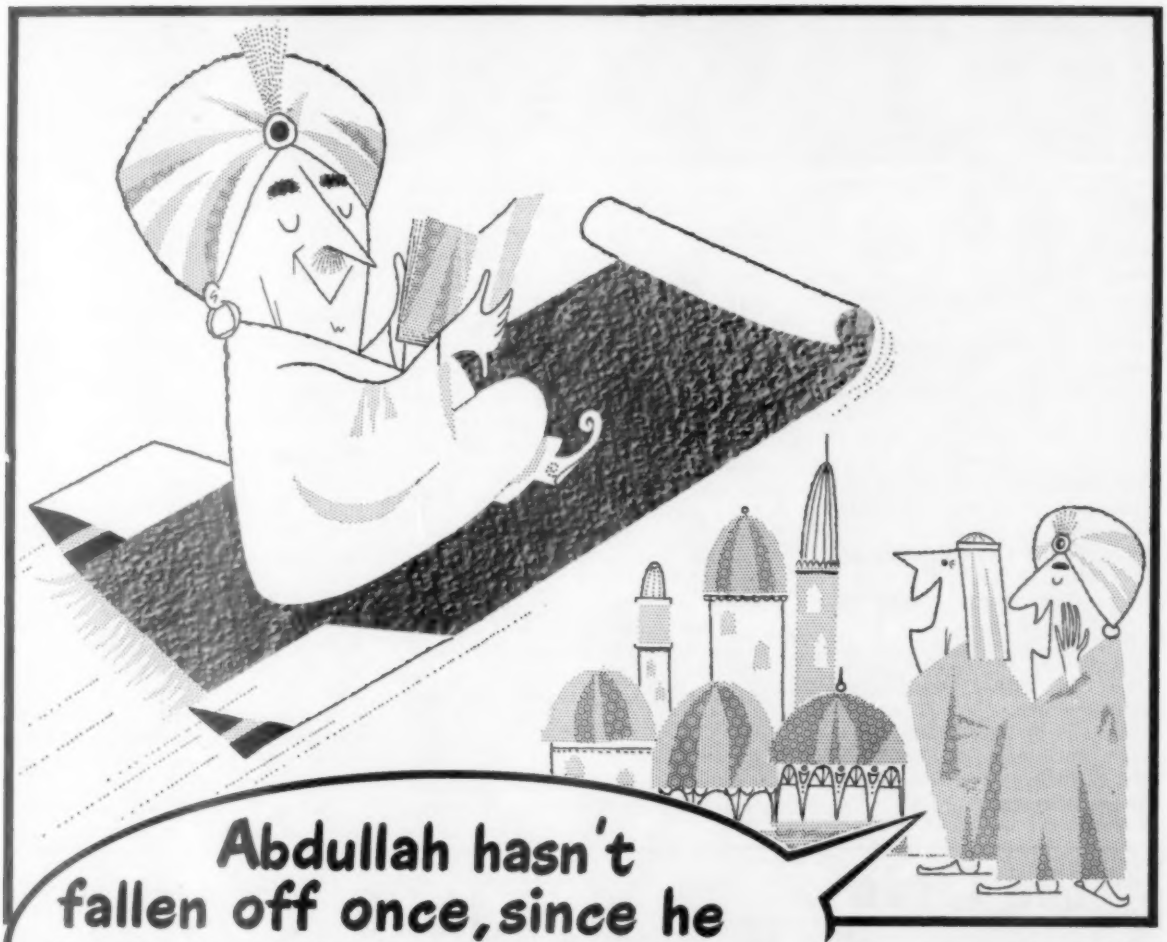
1. **THE AWARD OF HONOR** is available (a) to units which complete 3,000,000 man-hours without a disabling injury, and (b) to units whose records, though not perfect, meet vigorous standards of excellence. These standards take into account the previous experience of the unit as well as the experience of the industry in which it operates. A unit must qualify on both frequency rate and severity rate.

2. **THE AWARD OF MERIT** has similar, but less exacting requirements Minimum number of injury-free man-hours needed to qualify is 1,000,000.

3. **THE CERTIFICATE OF COMMENDATION** is available only for injury-free records covering a period of one or more full calendar years and totaling 200,000 to 1,000,000 man-hours.

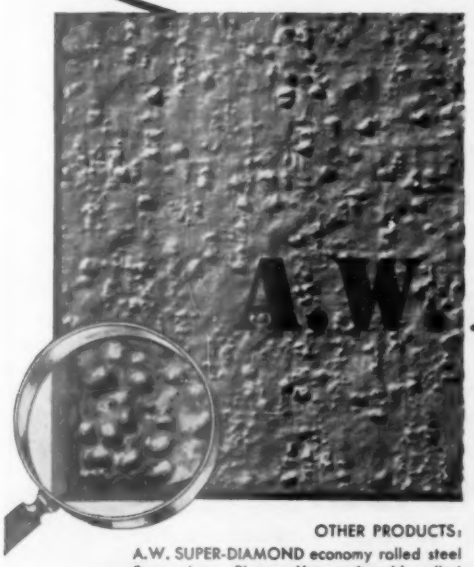


Abdullah hasn't fallen off once, since he installed A.W. ALGRIP!

Now . . . he can even do aerobatics without ever using a safety belt. Abdullah knows that traction results from friction and that A.W. ALGRIP Rolled Steel Floor Plate provides the best traction possible wherever slipping might occur.

A.W. ALGRIP is made by a patented process in which grinding wheel type abrasive is rolled—*not coated*—to a controlled depth, as an integral part of tough steel floor plate. Wear merely exposes more abrasive . . . safety lasts for the life of the installation.

Check your plant for areas where slipping hazards may exist. A.W. ALGRIP provides supersafe footing under the most hazardous slipping conditions . . . even where water, oil or grease may collect . . . even on inclined surfaces. A.W. ALGRIP can be installed as independent flooring or flooring overlay. Send the coupon for A.W. ALGRIP information, today.



ALGRIP ABRASIVE ROLLED STEEL FLOOR PLATE

ALGRIP—approved for safety by Underwriters' Laboratories

ALAN WOOD STEEL COMPANY
Conshohocken, Pa.

Please send A.W. ALGRIP Booklet AL-E27

Name_____

Title_____

Company_____

Address_____

City_____ Zone_____ State_____

OTHER PRODUCTS:
A.W. SUPER-DIAMOND economy rolled steel floor plate—Plates—Hot and cold rolled sheet and strip—(Alloy and Special Grades)

Circle Item No. 41—Reader Service Card

Safety Library

—*From page 96*

Las Animas County, Colo. U. S. Bureau of Mines Publications Section, 4800 Forbes St., Pittsburgh 13, Pa. 1958. 23pp. Information Circular 7852.

Injury Experience in the Coking Industry, 1955. U. S. Bureau of Mines. Publications Section, 4800 Forbes St., Pittsburgh 13, Pa. 1958. 20pp. Information Circular 7841.

Methods and Operations at the Yerington Copper Mine and Plant of the Anaconda Co., Weed Heights, Nev. U. S. Bureau of Mines, Publications Distribution Section, 4800 Forbes St., Pittsburgh 13, Pa. 1958. 37pp. Information Circular 7848.

Proceedings of the 34th Annual Conference of the Lake Superior Mines Safety Council, May 22-23, 1958. Allen D. Look, secretary, 329 Federal Bldg., Duluth, Minn. 145pp.

Panic

Psychology of Panic. John L. Bryan. Fire Service Extension Department, University of Maryland, College Park, Md. 1958 (A paper presented at the Thirtieth Annual Fire Department Instructors Conference, Memphis, Tenn.)

Parks and Forests

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Vending Machines

Standard for Vending Machines, Coin-Operated, Refrigerated. Underwriters' Laboratories, Inc., 207 E. Ohio St., Chicago 11. 1958. Standards for Safety UL541, First Edition.

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Aeronautics

"Aircraft X-Ray Is Versatile Maintenance Tool." *Business/Commercial Aviation.* August 1958. pp. 47-49.

"Anti-Collision Device Tests Promising." Philip J. Klass. *Aviation Week.* September 1, 1958. pp. 32-33.

Acids

"Acute Toxicity of Red Fuming Nitric Acid-Hydrofluoric Acid Vapor Mixture." *A.M.A. Archives of Industrial Health.* September 1958. pp. 218-221.

Automation

"Automation and Industrial Health." John H. Foulger. *American Association of Industrial Nurses Journal.* August 1958. pp. 18-19.

Dermatoses

"Occupational Dermatoses—Predisposing and Direct Causes." *The Journal of the American Medical Association.* August 30, 1958. pp. 2203-2205. (Report prepared by the Committee on Occupational Dermatoses of the Council on Industrial Health.)

Diving

"Medical Aspects of Recent Trends in Diving." Gerald J. Duffner. *A.M.A. Archives of Industrial Health.* September 1958. pp. 208-212.

Electrical Industry

"It's the Second Contact That Kills." Roy C. Keddy. *Electric Light and Power.* September 1, 1958. pp. 34-35.

Electricity

"An Inexpensive Device to Test Your Appliances for Electrical Safety." *Consumer Bulletin.* September 1958. pp. 26-28.

"Europe's Record of Electrical Fatalities." Eng. L. Simon. *Electric Light and Power.* September 15, 1958. pp. 60-67.

"Safety Flies a Flag." *Appliance*

use ONE BOL' TAB®

each week to keep toilet bowls sparkling clean!

BOL' TABS —the toilet tablet that's powerful and safe!

KILLS STAPH IN 30 SECONDS*

- Bol-Tabs are individually wrapped in foil, exactly the right amount of cleaner to keep the toilet bowl sparkling clean.
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Simplify your sanitary cleaning routine now. Put an end to acid accidents! Order a trial supply of Bol-Tabs today.

Please write for name of your distributor.
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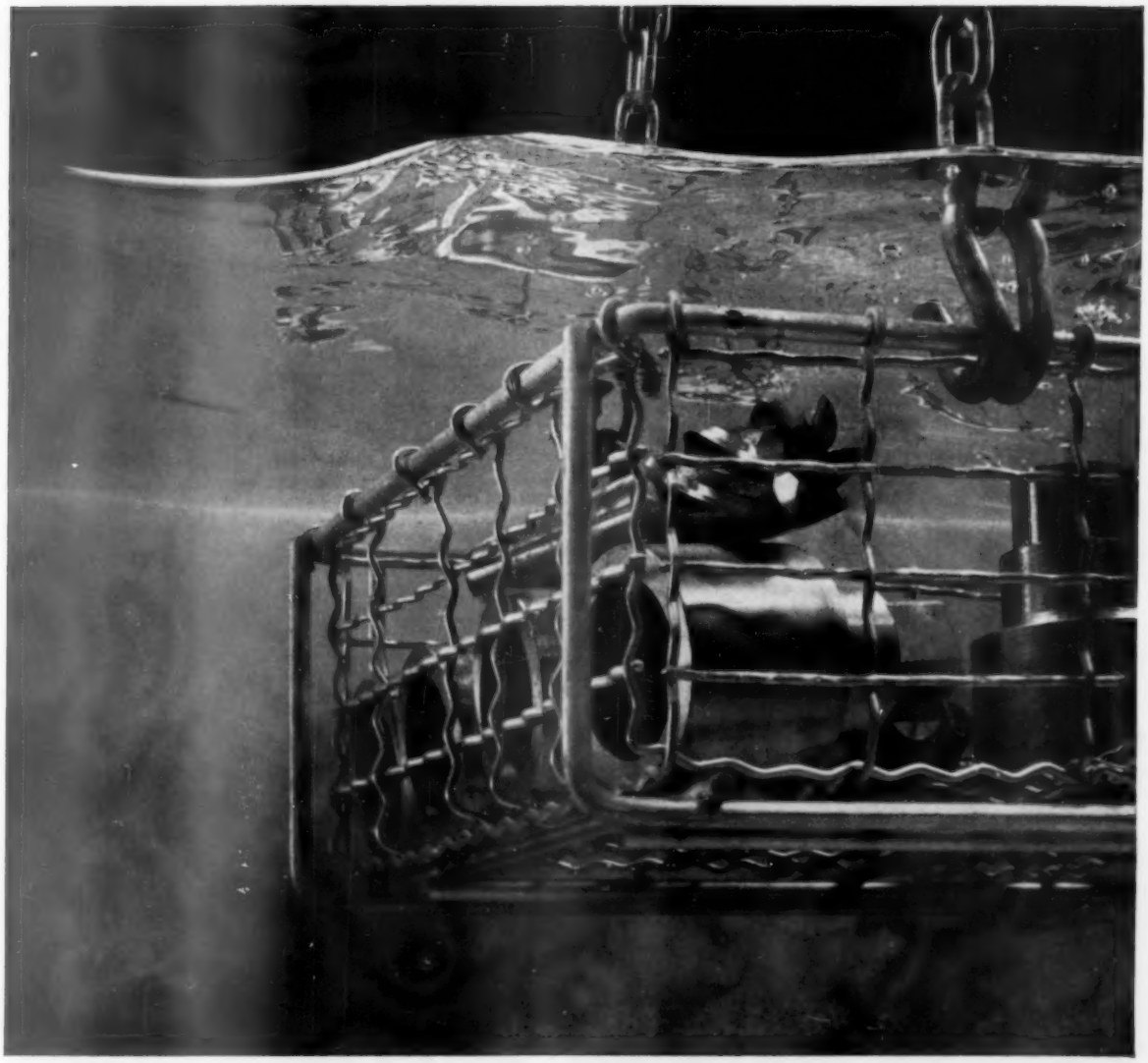

For sure, safer cleaning—try Chlorothene

Superior solvent for production and maintenance cold cleaning

For any type of industrial job—dip, spray, wipe or bucket cleaning—your best bet is Chlorothene® (Dow 1,1,1-trichloroethane, inhibited). This unique Dow solvent removes grease, oil, lubricants and other contaminants quick as a wink, leaving metal parts and equipment with no oily residue.

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If you aren't using Chlorothene already, there's no better time than right now to start. Try it on any production or maintenance cold cleaning operation in your plant. Contact your Dow solvents distributor—same source of supply for Dow Perchloroethylene Industrial, Dow Methylene Chloride, and Dow Trichloroethylene in two new types.

Write today for the Chlorothene book. THE DOW CHEMICAL COMPANY, Midland, Michigan, Dept. SO 1151B.

YOU CAN DEPEND ON DOW

Circle Item No. 43—Reader Service Card

Manufacturer. September 1958. pp. 72-73. (Safe Electrical Cord Committee promotes appliance safety through educational program.)

Fertilizer

"Be Safe with Fertilizer-Pesticide Mixtures." John Mark. *Farm Chemicals*. September 1958. p. 20.

Fire Protection

"Fashions in Fire Fighters' Apparel." Sidney Wohlfeld. *Fire Engineering*. August 1958. pp. 732-733.

"Instruments to Ferret Out Hidden Fire and Explosion Hazards." *Fire Engineering*. August 1958. pp. 718-719.

"A Survey of Rocket Propellants." Paul F. De Gatta and others. *Fire Engineering*. August 1958. pp. 676-678.

Handicapped

"High Rating for the Handicapped." *Supervision*. September 1958. p. 23.

Health Hazards

"Stannosis—Benign Pneumoconiosis Owing to Inhalation of Tin Dust and Fume." I. Environmental and Experimental Studies. Herman Oyanguren and others. II. Clinical Study. Pedro Schuler and others. *Industrial Medicine and Surgery*. September 1958. pp. 427-435.

Hearing

"Economic Aspects of the Noise Problem." Gordon Winbigler. *Noise Control*. July 1958. pp. 34-36. (Fourth West Coast Noise Conference.)

"Hearing Conservation in Industry." Fred W. Braun. *Noise Control*. July 1958. pp. 37-39. (Fourth West Coast Noise Conference.)

Hospitals

"How to Test Hospital Operating Rooms." Clark F. Jones. *Firemen*. September 1958. p. 31.

"Labels for Nursing Station Medication Containers." George F. Archambault. *Hospitals*. September 16, 1958. p. 50.

"Safety Measures in the Operating Room." Imogene Creber. *Nursing Outlook*. September 1958. pp. 528-531.

Hotels

"Upgrading Hotel Fire Safety in Winnipeg." E. G. Simpson. *Quarterly of the National Fire Protection Association*. July 1958. pp. 28-37.

Insects

"Occupational Exposure to the Imported Fire Ant." Wm. L. Wilson and Richard B. Eads. *Industrial Medicine and Surgery* September 1958.

Labor Unions

"AGC of St. Louis Sponsors Safety Week." *The Constructor*. September 1958. p. 70.

Marine

"Submarine Medicine on Nautilus and Seawolf." Lt. Comdr. J. H. Ebersole. *A.M.A. Archives of Industrial Health*. September 1958. pp. 200-207.

Mines

"Nuclear Blast in Your Mine or Quarry?—It's Possible." John E. Crawford. *Pit and Quarry*. September 1958. pp. 122-125.

"Safety Features in the Design

In the silence of the night

the watchman makes *his* rounds while the hands on his CHICAGO Watchclock make *their* rounds.

In the morning, there is a permanent dial-record of exactly where the watchman was during each hour...in the silence of the night.

The tamperproof CHICAGO Watchclock system is approved by both THE UNDERWRITERS' LABORATORIES and by THE FACTORY MUTUAL'S LABORATORIES. It gives extra protection against fire, theft and sabotage.

CHICAGO WATCHCLOCK
The first—and still the first

Quickly pays for itself... REDUCES INSURANCE RATES

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1524 S. WABASH AVE., CHICAGO 5, ILL.
OFFICES IN PRINCIPAL CITIES

Circle Item No. 44—Reader Service Card

Tuffy. Tips On

SAFE USE OF SLINGS AND HOIST LINES

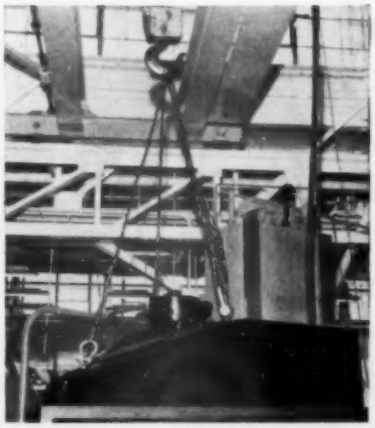
Back Injuries and Strains Loom Large in Industrial Accident Picture

Records for recent years in Illinois, as reported by the State Department of Labor, show an average of 8.9% of all compensation cases closed are for back injuries; another 7.4% for strains and overexertion in lifting or lowering. A total of about one in every six claims are for these two categories of injury.

How can we reduce materials handling accidents? The first answer, of course, is not to use human muscle for the heavy lifting jobs that should be done by the proper size hoist, hoist line and slings.

Here are some other answers:

1. **Keep pull** on sling legs in a straight line. Never shorten legs with knots or I-bolts. If choker and basket hitches are used as slings, safe load limits should be rigidly checked.
2. **Load slings** on the center of hooks; never at their points, except for hooks specially designed for point-loading.
3. **Never use** load hooks that are bent open. They have been overloaded, and may drop loads with disastrous results. Same goes for defective chain blocks. Insist that your men report them at once.
4. **Lubricate wire** ropes at regular recommended intervals, with lubricant recommended by your local oil company engineer.
5. **Break in** new wire rope with care. Don't use it as maximum load capacity until it is broken in.



Bad Use of a Good Sling

Here you see a Tuffy Sling in a poor, off balance hook-up. A Tuffy Type U-9, 3 leg bridle Sling would save time and work far more safely than this improvised hitch with unfitted slings and clevises.

Right and Wrong Ways to Uncoil Wire Rope

RIGHT:

Wire rope in short lengths is furnished in coils. Roll the coil slowly like a wheel and have a nice straight rope before you can say "tuffy."

WRONG:

Uncoiling by laying the coil flat and pulling off the top gives you hard-to-handle, kinky rope. Frustrating and time-killing!

FREE! Tuffy Sling Handbook

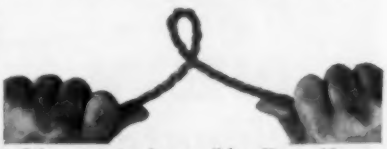
Gives complete data on Tuffy Slings — types, dimensions, weights and rate loads. Plus a complete rigger's manual and engineers notebook on wire rope constructions and specifications. Write for your copy now.

Get Safety First With The First Name In Slings... Tuffy.

Exclusive Tuffy Fabric

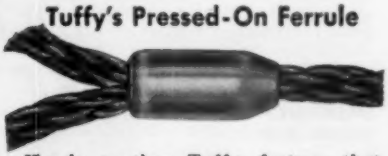
The secret of the extra strength and greater flexibility of Tuffy Slings is also the secret of their greater safety. It's the exclusive, patented, machine-braided fabric. You won't find it in any other machine-made sling. It means longer sling life, easier handling and greater capacity for taking deadloads, shocks and impact with safety.

Try to Kink a Tuffy Sling



It's next to impossible. Even if you do succeed in kinking it with the help of a vise, you can straighten out the sling with no material damage to the fabric. Tuffy's resistance to knotting, kinking and looping is extra protection against hazardous weakening of the sling.

Tuffy's Pressed-On Ferrule



Here's another Tuffy feature that adds safety to longer sling life. Applied under tremendous pressure, the steel ferrule literally flows into spaces between wires and strands—giving the eye-splice *full strength of the fabric.* And the streamlined ferrule eliminates snags and projections that might injure hands.

Your Tuffy Distributor is Stocked to Meet Your Needs—Fast!

He's ready with all your Tuffy Slings and Union Wire Rope needs. And ready to help you with any sling or wire rope problem. Get in touch with him now!

union Wire Rope corporation

SUBSIDIARY ARMCO STEEL CORPORATION

Specialists in high carbon wire, wire rope, braided wire fabric, stress relieved wire and strand.

2224 Manchester Ave. **Kansas City 26, Missouri**

Circle Item No. 45—Reader Service Card

and Development of Ireland Mine." G. W. McCaa. *Coal Age.* September 1958. pp. 92-93.

Motors

"Cleaning Electric Motors with Solvents." G. F. Walters. *The Plant.* September 1958. pp. 54-55.

Petroleum Industry

"D-X Sunray 'Plays It Safe' Around Acid." *Petroleum Week.* September 5, 1958. p. 34.

Physical Examinations

"Do Periodic Health Appraisals Pay Dividends?" C. E. Martin and M. J. Hanley. *Industrial Medicine and Surgery.* September 1958. pp. 461-465.

Pulp & Paper Industry

"Reducing Costs Through an Effective Safety Program." Ralph V. Metz. *Southern Pulp and Paper Manufacturer.* September 10, 1958. p. 48.

Psychology

"The Accident-Prone Individual." David W. Abse. Reprint. *North Carolina Medical Journal.* May 1958. 15pp. (Presented at the Fifth Annual Seminar on Occupational Health, N. C. Memorial Hospital, Chapel Hill, February 7, 1958.)

Respirators

"Respiratory Protective Devices." R. A. Fulton and F. F. Smith. *Agricultural Chemicals.* September 1958. pp. 22-24.

ADDRESSES OF MAGAZINES MENTIONED

Readers are asked to send their requests for copies of magazine articles to the publishers, rather than to the NSC Library, which is unable to fill such orders.

AMA Archives of Industrial Health, American Medical Association, 535 N. Dearborn St., Chicago 10.

Agricultural Chemicals, Industrial Publications, Box 31, Caldwell, N. J.

American Association of Industrial Nurses Journal, 654 Madison Ave., New York 21.

Appliance Manufacturer, Watson Publications, 201 N. Wells St., Chicago 6.

Aviation Week, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36.

Business/Commercial Aviation, 205 E. 42nd St., New York 17.

Coal Age, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36.

The Constructor, Associated General Contractors of America, Munsey Bldg., Washington 4, D. C.

Consumer Bulletin, Consumers' Research, Inc., Washington, N. J.

Electric Light and Power, 6 N. Michigan Ave., Chicago 2.

Farm Chemicals, Ware Bros. Co., 317 N. Broad St., Philadelphia.

Fire Engineering, Case-Shepperd-Mann Dept., 305 E. 45th St., New York 17.

Firemen, National Fire Protection Assn., 60 Batterymarch St., Boston 10.

Hospitals, American Hospital Assn., 18 E. Division St., Chicago 10.

Industrial Medicine and Surgery, Industrial Medicine Publishing Co., 605 N. Michigan Ave., Chicago 11.

Journal of the American Medical Assn., 535 N. Dearborn St., Chicago 10.

Noise Control, Editor, 1278 Massachusetts Ave., Cambridge 38, Mass.

The North Carolina Medical Journal, The Medical Society of the State of North Carolina, 203 Capitol Bldg., Raleigh, N. C.

Nursing Outlook, American Journal of Nursing Co., 2 Park Ave., New York.

Petroleum Week, McGraw-Hill Publishing Co., 330 W. 42nd St., New York 36.

Pit and Quarry, Pit & Quarry Publications, 431 S. Dearborn St., Chicago 5.

The Plant, Plant Publishing Co., St. Joseph, Mich.

Quarterly, National Fire Protection Assn., 60 Batterymarch St., Boston 10.

Southern Pulp and Paper Manufacturer, E. H. Abernethy Publishing Co., 75 Third St., N. W., Atlanta, Ga.

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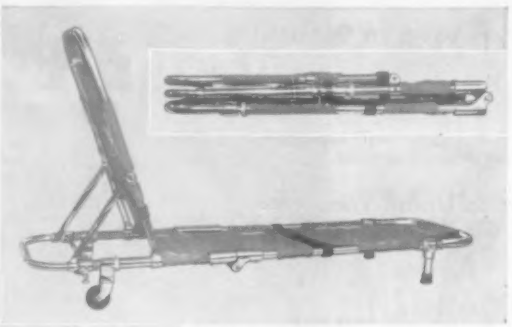
only 8¼" HIGH!

NEW
Washington Ambulance COT!!

Now you can get an ambulance cot that is REALLY LOW — only 8¼ inches high — the perfect answer for cars that have less head room, and for overhanging stretchers. The new Washington model 21-L is of special value for heart cases, and other patients who must be kept in a sitting position. Washington's famous top-quality craftsmanship is apparent throughout this new model cot with such features as sturdy, rigid construction . . . highly polished aluminum tubing and castings . . . very lightweight yet strong . . . trigger release side rails . . . adjustable back rest with nine-position squeeze-lock adjustment. It always pays to choose Washington for the newest and best in all emergency room or vehicle requirements.

ADJUSTABLE-BACK EMERGENCY STRETCHER MODEL 9AB

Four adjustable positions on back rest, folds to only 4½ inches high! One of Washington's complete line of folding emergency stretchers for every need, in every price range.



NEW PUSH-TYPE COT FASTENER MODEL 3A

This new and improved cot fastener holds cots securely in station wagons and other types of emergency vehicles. Washington makes four other models of cot fasteners, to meet every need for any kind of vehicle. Tell us the make and model of your vehicle, and we'll recommend suitable fasteners.

See your jobber or write for FREE catalog!

Washington Products Co.
WASHINGTON COURT HOUSE, OHIO

Circle Item No. 46—Reader Service Card

A famous blind general tells why it's good business to see the **"ability"** in "dis**ability**"

Wausau Story

By Major General **MELVIN J. MAAS,** *USMCR, Ret.*
Chairman, the President's Committee on Employment of the Physically Handicapped

Veteran of three wars, blind Major General "Mel" Maas examines historic plaque at Civil War battleground of Antietam. Former member of Congress from Minnesota, holder of the Silver Star, Legion of Merit and Purple Heart, General Maas works tirelessly for the employment of the physically handicapped.

Chairman of the President's Committee on Employment of the Physically Handicapped, General Maas gets the "feel" of Fairchild's sleek new 40-passenger Propjet liner—the F-27 from physically handicapped Fairchild worker, Ernest Kunz (right).

At Antietam national battleground site General Maas visits with the family of Ernest Kunz. Kunz who lives and works near the historic site typifies to the General how employment of the physically handicapped rehabilitates entire families.

"As I talked recently to Ernest Kunz, former member of the U.S. Air Force, I found a completely rehabilitated man. Ernie, although still classified as 90% physically disabled, is happily and *usefully* employed at Fairchild Aircraft Division in Hagerstown, Maryland. I also talked to his wife and children on a family outing and I could just feel their pride in Ernie. I didn't need to *see* their happy faces.

"It's *good business* to hire the physically handicapped. Records prove that *these workers actually produce at higher rates than unimpaired workers on the same jobs* and that they have fewer accidents.

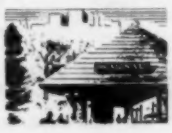
"Fairchild's hiring policy is typical of this enlightened management. It starts with skillful job analysis and placement to fit the handicapped worker's abilities. The in-plant physician and safety engineer see that the handicapped employee can meet the job requirements in a safe manner.

"Working closely with this Fairchild team is the company's workmen's compensation carrier, Employers Mutuals of Wausau. They exemplify the entire insurance industry's helpful and cooperative attitude toward this program.

"I urge *all* employers to see the 'ability' in 'disability'."

The entire insurance industry and especially we at Employers Mutuals of Wausau, as one of the largest in the field of Workmen's Compensation are 100% for the program of employing the physically handicapped. We have long had an active part in it. We know that physically handicapped individuals when properly placed in jobs are less accident prone than other workers. Above all they are loyal and faithful employees. Getting these physically handicapped to become credits instead of debits is good business for everyone. We are grateful to General Maas for helping us bring this important opportunity to the attention of American business.

Employers Mutuals *of* Wausau



"Good people to do business with"

Circle Item No. 47—Reader Service Card

Pressure-Sealed Plant

—*From page 43*

delay or confusion in an emergency. Each door has a special tongue and groove seal with a 40-60 durometer rubber gasket tested to withstand 37 psig pressure at all temperatures from ambient to 350F.

In normal operation the locking mechanism forces the door tongue only deep enough into the gasket to seal against an internal or external pressure of 2 psig. Because of this limited penetration the locking mechanism doesn't require a large mechanical advantage to operate properly.

Higher pressures provide greater seating force to fully imbed the tongue in the gasket and to provide complete contact between the door and the gasket. Since high pressures can produce larger gasket seating loads than required to seal the door, stops are provided on the door frame to limit penetration of the tongue into the gasket.

The locks will be equipped with lights and telephones. As it may be desirable to have both doors open when the plant is not in operation, the interlock may be violated. However, special tools and procedures are required so the interlock can be disengaged only by specific authorization of the plant management.

Winter Wonderland

—*From page 27*

should be adequate between heating systems and combustible floors, walls, partitions, platforms, and stock. Adequate insulation is a must.

Doors, windows, and other openings in poor condition can cause freeze-ups of sprinkler systems. Special attention should be paid to heating facilities near entries, truck doorways, and similar openings.

Well-Trained Watchmen

A check list of fire protection equipment and common winter fire hazards should be prepared. Thorough inspection is essential, especially during nights and weekends. Worth remembering is the increase of fire risk during idle periods in cold weather, when plant temperatures drop.

Well-trained watchmen should have complete knowledge of the property, including the location and purpose of all sprinkler equipment, each dry pipe valve, control valve, hydrant, tank, fire pump, and other apparatus. All valves must be open, unless repairs are in process. All closed valves must be tagged out.

Here is a partial pre-winter check list:

1. Make plans for prompt removal of snow from roads, around control valves, hose houses, hydrants, indicator valves and similar places.

2. Test automatic controls on heating equipment in the plant.

3. Pits containing valves and fittings should be dry and frostproof.

4. See that sprinklers or standpipes in unheated spaces are protected against freezing. Exposed locations include space between the ground and the first floor, and between buildings.

5. Be sure heater capacity prevents ice forming inside the gravity tank.

6. Keep the pump room heated.

7. Make sure hose has been drained and is properly arranged in all hose houses.

8. Post signs, and instruct watchmen and employees regarding freeze-prone equipment that has been removed to heated areas from its usual location.

9. Check anti-freeze solution in

These Flexible Coated PIONEER Gloves

Provide Long Wearing Liquidtight Protection For Materials Handling

Neoprene Coated Flannel Stanzoil Pacemakers

Length	Style	Weight	Model
10"	Knit wrist	Light	80
10"	Knit wrist	Industrial	90
10"	Knit wrist	Heavy Duty	95
10"	Gauntlet	Industrial	100
10"	Gauntlet	Heavy Duty	105
12"	Gauntlet	Industrial	120
12"	Gauntlet	Heavy Duty	125
14½"	Gauntlet	Industrial	140
14½"	Gauntlet	Heavy Duty	145
18"	Gauntlet	Industrial	180
12"	Gauntlet	Twin lined*	225

* No. 225 designed to protect hands from extreme hot and cold temperatures.

Pylox™ Coated Jersey Stanflex

Model	Style	Size	Length
5062	Knit wrist	Men's	10"
5052	Knit wrist	Women's	10"
5232	Band top	Men's	11"
5132	Gauntlet	Men's	12"
5252	Gauntlet	Men's	14½"

the PIONEER Rubber Company
237 Tiffin Road. Willard. Ohio
Circle Item No. 48—Reader Service Card

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☐ 17" x 22" Full Line Glove Wall Chart

☐ Job Description Form For Free Hand Protection Analysis

(COATED)

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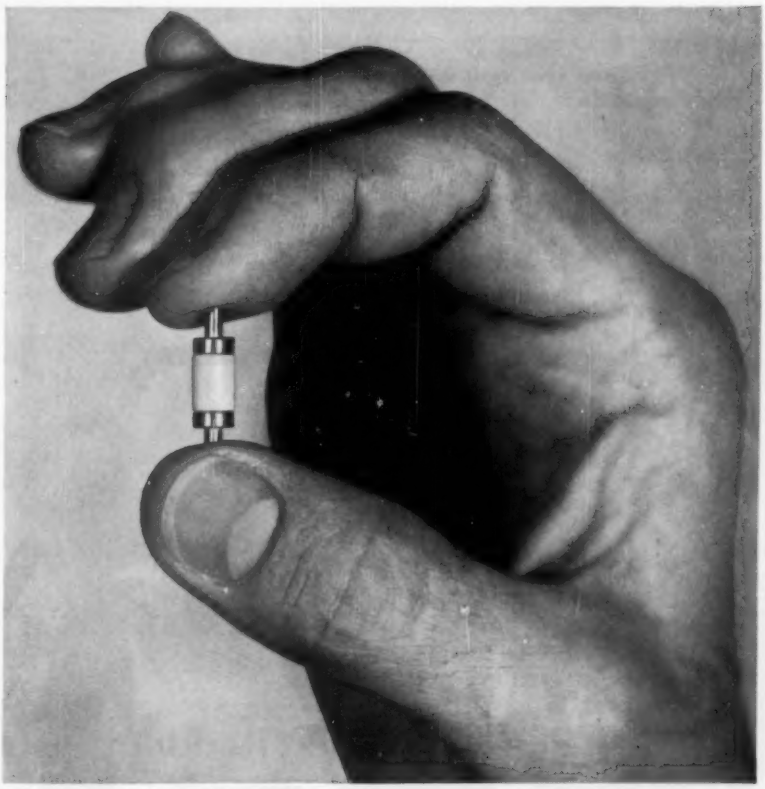
NEW DIODE SPEEDS VOICES—



AT 6,000,000,000 C. P. S.

How the radio art can be improved through solid state science is illustrated by a recent development at Bell Telephone Laboratories. To make voice signals travel by microwaves they must first be "converted"—caused to vibrate at billions of cycles per second. To date, it has been possible to accomplish this conversion only at the cost of appreciable loss of signal energy. Could a more efficient converter be provided?

In the field of solid state science it was known—as a laboratory curiosity—that semiconductor diodes can be made not only to convert the frequency of signals, but also to amplify them. At Bell Laboratories Dr. Arthur Uhlir, Jr., and his associates calculated that this amplifying action could be put to practical use. They proved the point by developing a junction diode converter which can deliver up to 40 times as much signal energy as previous converters.

This efficient new converter will be applied in a new Bell System microwave highway able to transmit thousands of telephone conversations and a dozen television programs simultaneously at six billion cycles per second. In other forms it is being developed, under U. S. Army Signal Corps contract, for radar and military communications where more efficient frequency conversion can also be used to advantage.

This development is an example of the many different ways in which the Bell System works to improve your telephone service and communications at large.

BELL TELEPHONE SYSTEM

IS THIS AREA *Radiation*-SAFE?

Protection of operational plant personnel from radiation hazards, while engaged in nuclear research, development and related operations, is being accomplished by safety-minded management and supervision with modern, Riggs Radiation Survey Instruments. They have found a positive answer in the proven Riggs Model GB-1 Portable Gamma-Beta Log-linear Survey Meter—preferred for its simplicity of design, ideal detection ability and wide radiation coverage—all in a *single* instrument for general survey work!

Highlight features of the GB-1 are its light weight, compactness and 3 ranges totaling 0 to 500 R/hr. Fast response, low-level range 0 to 1 mr/hr. Other ranges available.

Write for complete information, specifications and prices on all Riggs "GB" Series instruments.

Manufacturer of Precision Nuclear Instruments

RIGGS
NUCLEONICS CORP.
717 North Victory Boulevard, Burbank, California

Circle Item No. 49—Reader Service Card

appliances normally requiring it.

10. Be certain the municipal fire department is familiar with the layout of plant and grounds and will have immediate access in an emergency.

Construction and maintenance work in unheated areas may require the use of salamanders. Sparks and flames and hot surfaces from these units can easily ignite nearby combustible materials. Dangerous amounts of toxic gases may be liberated in confined spaces. Oilsoaked clothing around any such heating equipment is a fire threat.

Don't set salamanders directly on wood floors or other combustible supports. A bed of earth, sand, or ashes at least three inches deep and reaching several feet beyond the salamander is necessary. When used in enclosed spaces, the salamander should be vented. Portable units, moved into spots where piping is not practicable, should not be used unless the room is ventilated by at least one opening.

Cold is a serious hindrance chiefly to yard workers, shipping dock employees, outdoor maintenance men, railroad section gangs and switchmen, and highway maintenance crews whose job it is to keep transportation flowing.

To reduce discomfort and possible illness, select workers adaptable to cold jobs. Make sure they have proper clothing that will provide protection without being too heavy, clothes that will keep the employee's hands, feet, ears, and nose warm. For temperatures colder than 50 below zero, a full face mask is required to protect eyes, ears, nose and mouth.

Zippered garments, when open, will reduce perspiration during work and will help avoid chilling during rest and rewarming periods. Such times should be alternated with exposure to cold. For acute chilling a hot shower (90 to 100 F) has been recommended. Rewarming in air may take several hours regardless of air temperature.

Some firms occupying large areas and having many outdoor workers may construct shelter houses. These can be provided with heaters, drinking fountains,

and wash basins. Showers available should provide water at not less than room temperature.

Slick walkways, steps, and loading platforms are an obvious snowtime hazard. Or people may be struck by icicles or falling snow. Snow can weigh as little as 200 lbs. or as much as 1,200 lbs. per cu. yd. Ice is even heavier. Roofs have collapsed from the weight of snow and ice.

Snow and water collecting in gutters, downspouts, or overhanging eaves frequently form long, heavy icicles. Water pipes may freeze and burst, resulting in leaks and floods during thaws, then refreeze into heavy ice formations that cover operating equipment and controls. These formations also may interfere with sprinkler and other fire protection systems.

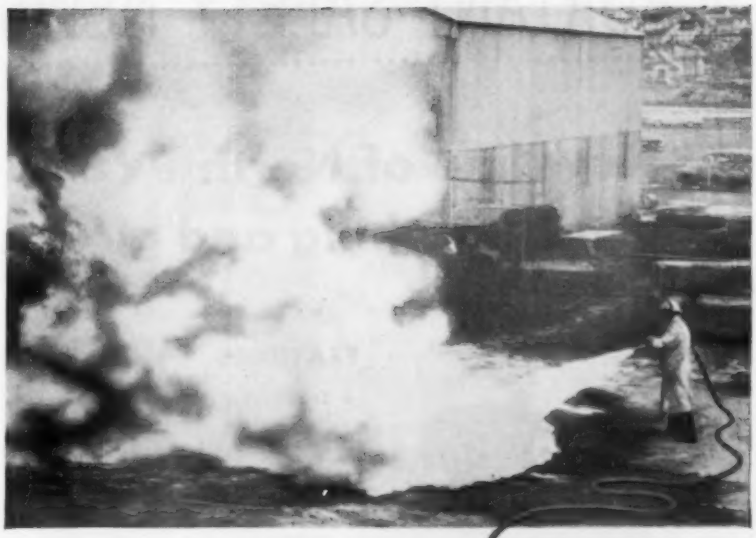
Check Weather Bureau reports during the winter to keep in touch with temperatures and the amounts of snow and ice to be removed. Methods for removal include: manual or power equipment; chemical agents; hot water and steam; and heating elements —buried pipes or electrical units.

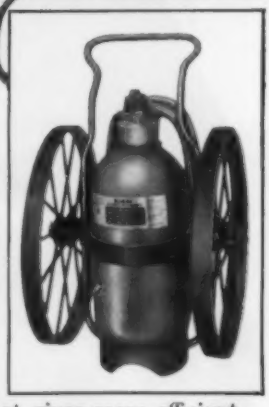
Hand shoveling should be done with lightweight aluminum shovels by men used to the exertion. Power-driven scoops, snow plows, or bulldozers may come in handy where much snow has accumulated or large areas are involved.

Sand, cinders, and ashes can make hard packed snow or ice relatively skidproof. Calcium chloride or sodium chloride (table salt) reduce the freezing point of water. Calcium chloride melts ice and anchors abrasives faster than salt, is effective at temperatures at which sodium chloride will not melt ice, and does not recrystallize but remains in solution.

On concrete surfaces these chlorides, used alone or with abrasives, should be applied as sparingly as possible. Repeated freezing and thawing of concrete in contact with these salts may cause surface pitting or scaling. The surface should be swept or flushed with hot water as soon as possible.

If hot water and steam are used, snow and ice must be completely





NEW!

One-Man Dry Chemical Kills More Fire Faster!

This new Kidde pressurized 200-pound extinguisher gets *more* fire-smothering dry chemical on a blaze *faster!* Its universal nozzle discharges a dense 40-foot stream that gives more efficient extinguishing action, greater heat protection for operator.

It has an *extra* 50 pounds of dry chemical to discharge on any stubborn blaze. Not 150 pounds, but a full 200 pounds of dry chemical – a 33⅓% bonus for safety! Yet its total weight is less – no heavy, cumbersome gas cylinder.

It's faster to operate too. No valves to unscrew. No wait for pressurization, for dry chemical to fluff. No pressure reducer to malfunction. Just remove safety pin, swing valve toggle, and flip "on-off" nozzle lever. There's no hose whip either.

Only Kidde has the Bridgeman seal head assembly. When pressurized at 450 psi with nitrogen or *dry* air, an inner force of three tons acts on the seal – the more pressure, the tighter seal. Virtually leakproof, tamper-proof.

Check these other benefits. A low, balanced center of gravity, wider handle, compact design, and larger, lubricated wheels make it easy to move. It's weather and corrosion protected. And the shielded dust-and moisture-proof pressure gauge tells at a glance this extinguisher's readiness for action.

Write Kidde today and get the full story on this new U.L.-approved One Man Fire Engine.

Kidde

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Circle Item No. 50—Reader Service Card

IMPORTANT SAFETY NEWS

New line of North PVC industrial clothing and gloves

FEATURES

- **Tough—last two to five times as long**
- **Flexible—allow full freedom of movement**
- **Resistant—withstand chemicals, oils and solvents; nonflammable and waterproof**

Seams are stitched with strong chemical and heat resistant thread, then shielded and electronically welded for liquid-proof security.

Pliable plastic buttons are electronically welded in place, providing greater strength than sewn types.

Raglan sleeve design and generous cut mean extra comfort.

North PVC fabric has excellent abrasion and snag resistance.

Garments are non-aging, nonoxidizing and nonflammable—remarkably easy to clean.

Safety fly front available with welded buttons, snap fasteners or zipper closure.

Gloves have a knitted interlocked fabric lining and are made with a special PVC compound providing great flexibility and two to five times the life of ordinary types.

The complete North PVC line includes industrial gloves, aprons, rain wear, and a wide range of protective clothing of all types. Write today for complete information.

JOMAC *Inc.*

Dept. D, Philadelphia 38, Pa.

Associated companies and distributors throughout the world

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drained and the surface squeegeed to prevent refreezing. In extreme cold weather, treated abrasive should be applied immediately.

Heating pipes buried in concrete walkways, loading platforms, and driveways eliminate the need for shoveling snow and chopping ice. Anti-freeze, such as high-boiling-point ethylene-glycol-base solutions, added to the water will prevent freezing when the system is not in operation.

Electric heating elements can be placed permanently during the construction of concrete walkways before the finish layer is applied. These elements can be controlled with manually-operated switches or automatically with thermostats.

A flexible lead-covered heating cable is frequently used. This is a portable device which may be plugged into an outlet. Heating cables, also used to prevent ice forming in gutters and downspouts, may be wrapped around

---

IF FIXED AUTOMATIC FIRE PROTECTION EQUIPMENT FREEZES:

1. Notify fire insurance company immediately. Give nature and extent of crippling. Tell precautions taken.

2. Restore full protection quickly.

3. If extensive repairs are needed, restore as much protection as possible. Discontinue hazardous operations. Enforce no-smoking rules. Station competent men at closed valves for reopening, if necessary. Instruct foremen in affected areas. Place extra watchmen in danger spots with ample portable fire extinguishers.

4. Don't try to thaw out pipe by torch or open flame or by wrapping pipe with oil-soaked cloths set on fire—an additional fire hazard. This short cut can convert ice to steam, causing excess pressure in piping and its eventual rupture. Light freeze-ups can be broken by wrapping frozen sections with cloths and soaking with hot water.

Severe freeze-ups usually require taking down pipe for thawing. Electricity can be used but only with competent supervision.

pipe lines and covered with insulation to prevent freezing, breakage, and leakage.

Infrared lamps can concentrate heat in a small area to remove ice from around valve stems, traps, and other movable fittings.

Non-slip grating for walkways, stairs, catwalks, and other surfaces are useful for many locations exposed to the elements. Snow falls through this grating instead of accumulating on the surface.

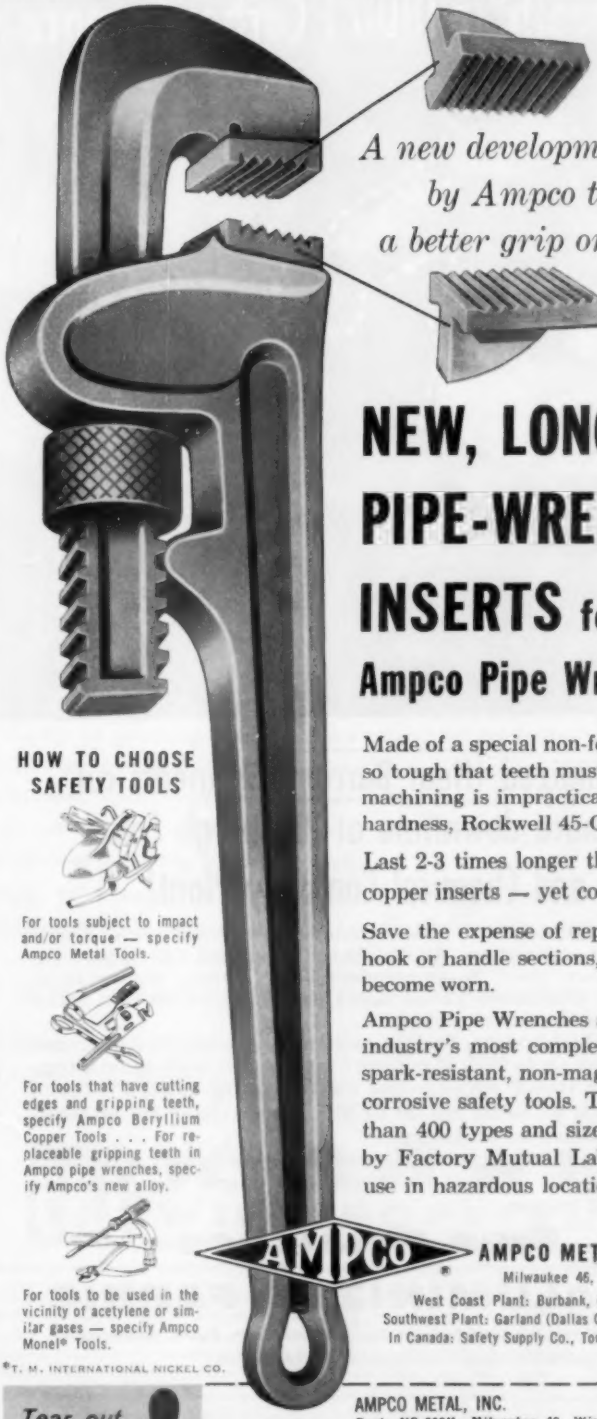
Breaking Par

—*From page 35*

Safety Engineering Department, and a former safety director at Public Service Company, acts as secretary. He is responsible for preparing and issuing the monthly meeting agenda and recording of the minutes. In addition, Mr. Bullock submits formal safety programs and ideas to the committee for action, as determined by experience, observations, accident analysis, or recommendations submitted through committee channels. The staff safety committee handles both employee and fleet safety problems. The St. Louis branch manager of Transit Casualty Company, Lou Sondermann, serves on this committee and provides a liaison between operations, management, and claims.

All employee or industrial safety problems are first screened by a second-level group known as "The Employee Safety Council," which is composed primarily of chairmen of various smaller safety committees throughout the property. The chairman of this committee is an officer in the operations department. Mr. Bullock also serves as secretary of this committee, plus functioning as a professional advisor on safety matters, similar to his function on the staff committee. Mr. Sondermann is likewise on this committee to present the claims problems firsthand. An agenda is furnished each member one week prior to the meeting (this is similar to the policy for the "staff" meeting),

AMPCO PIPE WRENCHES MEET U. S. GOVERNMENT HEAVY-DUTY REQUIREMENTS



A new development by Ampco to give you a better grip on safety!

NEW, LONG-LIFE PIPE-WRENCH INSERTS for all Ampco Pipe Wrenches

Made of a special non-ferrous alloy so tough that teeth must be cast in — machining is impractical. Minimum hardness, Rockwell 45-C.

Last 2-3 times longer than beryllium copper inserts — yet cost no more!

Save the expense of replacing entire hook or handle sections, when jaws become worn.

Ampco Pipe Wrenches are part of the industry's most complete line of spark-resistant, non-magnetic, non-corrosive safety tools. There are more than 400 types and sizes approved by Factory Mutual Laboratories for use in hazardous locations.

HOW TO CHOOSE SAFETY TOOLS

For tools subject to impact and/or torque — specify Ampco Metal Tools.

For tools that have cutting edges and gripping teeth, specify Ampco Beryllium Copper Tools . . . For replaceable gripping teeth in Ampco pipe wrenches, specify Ampco's new alloy.

For tools to be used in the vicinity of acetylene or similar gases — specify Ampco Monel® Tools.

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Aluminized Heat Barrier Garments cut furnace downtime at Pittsburgh Coke and Chemical Company Plant!

Replacing agitator teeth in a carbon furnace means working next to 1800°F temperatures. At Pittsburgh Coke and Chemical Company's carbon plant, Superintendent J. W. Brady, reports lightweight 3M Aluminized Fabric safety clothing gives his men better protection and greater comfort.

Why? Lightweight, flexible garments made of 3M Aluminized Fabric reflect up to 90% of radiant heat—permit work against temperatures of 1800°F without time loss for cooling down. 3M Aluminized Fabric garments last 30 to 50% longer—have higher resistance to molten splatter damage.

Leading safety clothing manufacturers can supply a complete line of garments made of 3M Aluminized Fabric. For facts—free sample send coupon.

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so advance thought can be developed and conserve meeting time.

All committees meet once a month, and are so timed in sequence that problems each month can be immediately channeled up to the next ranking body, if need be, ending with the top level staff safety committee. Naturally, most items are settled before traveling through all the committee levels. Meeting lengths are held to a minimum.

It is important to note that membership on the lower echelon committees are rotated so that as many hourly men as possible get a chance to be exposed to safety committee activities.

Inspection committees likewise have a rotating membership, with the foreman of the section, and the union steward being the only permanent members. Prompt handling of reported physical hazards has done much to instill confidence and demonstrate that "the company is serious" about safety. To illustrate, from 1952 through 1957, more than 1600 inspection items have been reported and processed. This involves areas covering the main office, main repair shops, utility buildings, and five operating divisions. As of December '57, approximately 1700 employees were bus and streetcar operators and 500 were maintenance, stores, and utility men.

The inspection program helped to make workers safety conscious, as attested by a comment by the superintendent of the company's automotive shops, who said, "I have men stop by to tell me of hazards observed in areas foreign to their own work." This is another clue to the safety teamwork that has been established. To further prove this point, the automotive repair shop, with about 350 men employed, has twice exceeded a record of 1,000,000 manhours without a disabling injury.

Programs and Promotions

To illustrate the continuing aspect of the safety effort, the following activities have been in effect during the past six years.

1. First Aid Program. This was for all supervisors, foremen and selected power and line employees. Artificial respiration and con-

trol of bleeding was emphasized. As the company maintains a full-time medical service on the property, only those first aid requirements related to the importance of "time" was stressed. This program has been repeated at scheduled intervals as a refresher course.

2. Fire Extinguisher Program. Actual demonstrations were conducted, and the regular inspection of extinguishers is done monthly, even though an outside service maintains the units.

3. Eye Protection Program. A special movie on the subject was shown to all maintenance employees, and proper protective equipment was made available. Follow-up action via talks and printed material is done regularly.

4. "Why-B-Safe" Program. This was an activity to get safety into the home and involve the family. Savings bonds were offered to members of an employee's family for the best essay of 100 words or less on why they wanted the employee to be safe *on* or *off* the job, and what it meant to the family to be free of accidents.

The nature of the essays displayed that the family can be and is a "compelling force" against accidents and will influence the worker. Some articles related personal experiences caused by accidents.

5. Special Mailings. With the assistance of the staff artist of Transit Casualty Company, Jay Tipton, a number of cartoon mailings have been sent directly to the homes.

Another special mailing advised, "Your Safety IS a Personal Thing—Be Your Own Safety Director—Take Safety Home with You!" The pamphlet cited facts and figures in concise form (with illustrations) showing that accidents strike anywhere, at any time, and involve any careless person. A special Christmas mailing was entitled "The Key to Safety—It's in Your Hands." This was a cartoon-illustrated pamphlet.

6. Safety Meetings. At periodic intervals, outstanding movies on safety have been shown to all employees. These have been care-

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The certified capacity of this sling when used as shown is:
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There's no guessing—when you buy CERTIFIED Wickwire Wire Rope Slings. The rated capacity and other pertinent data are plainly visible on the laminated clear plastic tag attached to each sling. Workmen can readily select a CERTIFIED Wickwire Sling that's right for a particular job, without having to refer to a data card or "spec" sheet.

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fully selected, so as to apply to off-the-job, as well as to on-the-job issues.

7. "Off-The-Job-Safety." In recent years, particularly in the fall, there have been national traffic safety programs as sponsored by the President's Conference Committee on Traffic Safety. Cooperation has been extended by developing special programs to the employees to stress off-the-job safety. For particular reference, a movie which was narrated by Bob Hope, entitled "Chain Reaction," was shown in connection with the "Safe Driving Day" national program, and in stressing the theme for December of 1957, one entitled "Fight Holiday Hazards" was shown.

At present, a special survey of off-the-job accidents involving employees and their dependents is being made by the secretary of the Public Service Employees Mutual Benefit Association, which is operated jointly by the company and employees to provide medical and hospital services.

8. "Near Miss" Bulletin. Once each month, the Safety Engineering Department of Transit Casualty Company issues a summary of all the "near misses" brought to their attention during the prior month. Although no injury occurred, it was felt that the lesson involved, plus the investigation, provided good material to each foreman and safety committee. Any disabling injury also receives comment. Names of persons involved are omitted.

9. Home Safety. Besides using direct mailings, home safety is frequently stressed in the company publication entitled *Transit Newsletter*. One issue devoted a full page to a check list of hazards that could be found in the home or the immediate area, such as the yard. These were all illustrated in cartoon form and had a scoring system.

10. National Safety Council Material. Much use has been made of Council materials in the safety program, especially the large safety banners; the adhesive footprint that can be placed on the floor to caution against falls; posters; various pamphlets (particularly those that refer to vacation hazards); five-minute safety talks for foremen; and publications like the *Safe Worker*, which is regularly distributed to all maintenance and utility employees.

11. Accident Investigation. The foreman is required to make a written report of every accident, regardless of loss of time. This policy has paid dividends many

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Regardless of the job — painting, cleaning, electrical, machinery work, window washing or glazing, building repair or special work — PS Co. Scaffolding can cut costs through . . .

- minimum job time due to freely moving, confident workers
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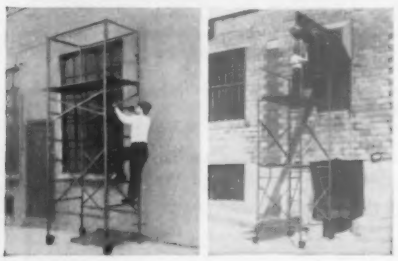
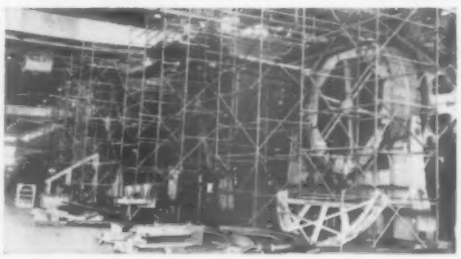
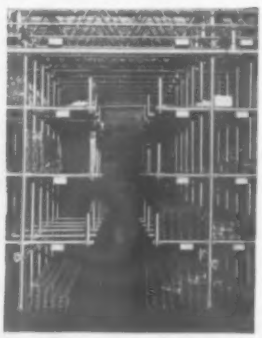
"Trouble Saver"® Rolling Scaffolds
Below, left, 3'-wide scaffolds with built-in ladders help on inside, outside work. Right, 5'-wide scaffolds provide correct height for hoist repair. Interlocking frames can be added to both for increased height. 2'-wide ladder Scaffolds also available.





"TubeLox"® Scaffolding
Made of only four basic parts, this scaffolding is erected to conform to any shape, size or contour. Adjustable couplers and tubes of various lengths permit unlimited design. Above, workers get all around curved shapes of atom subs. Right, couplers and interlocking steel tubes make heavy-duty storage racks.



For complete information on scaffolding and ladder equipment engineered and designed to help you cut costs on any industrial work . . . write for Bulletin G205RR.

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Circle Item No. 55—Reader Service Card

times. To illustrate, in one instance a mechanic using an electric drill received a shock. Investigation disclosed a wiring defect. All electric hand tools were then equipped with 3-wire conductors.

In another instance of follow-up involving a foreman's report, a man complained of skin irritation from using a solvent. The Safety Engineering Department made a complete investigation and discovered that carbon tetrachloride was used at many locations. A substitute was secured and the employees involved were given person-to-person talks, with illustrations, on the use of solvents.

12. Housekeeping. Management and the officials of the equipment department have stressed the importance of good housekeeping. Aisles are always marked and kept clear, and in the storage room nothing is stored at any altitude in bins. Specially constructed waist-high storage facilities, with the top portion provided with numerous small compartments accessible from the top, provide easy and ready access and provide for rapid inventory. The larger items are stored underneath, on metal shelves, or on the floor in a separate area.

In the main repair shops, every Friday afternoon is extra clean-up time when every available man helps put the house in order for the coming week.

13. Case Interview Plan. The American Transit Association developed a special plan to interview employees when discipline is involved. This provides for a businesslike procedure, with a written record, wherein a certain understanding must be mutually arrived at and become a part of the personnel record. Compliance with safety regulations is part of the procedure.

14. Maintenance Award. The shops of St. Louis Public Service Company have received the top national award for maintenance efficiency during the past 11 consecutive years.

Seeing Eyes on the Job

—From page 44

years old and not wearing corrective glasses. Incidentally, visual skills desirable for most job classifications in a foundry are farther away than average reading distance. The near-point skill necessary is almost at arm's length.

On a majority of jobs at this plant near vision was considered as seeing ability at arm's length. The greatest number of non-corrected visual problems at this firm fell in the 45 to 55-year-old age group. Because near-visual skills deteriorate at a slow pace, many persons delay obtaining visual care, especially when they have never previously needed a correction. Non-correctable factors are mainly due to pathology; age level seems to be no factor.

After professional attention, nine employees at the plant were classified as "industrial one-eyed." A breakdown of the diagnosis on each of these individuals showed

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Safety Platform Step Ladder
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Handy tool rack at top, built-in.
Hinges— 14 gauge, heavy duty steel.
Hardware— plated to resist rust.
Broad working platform, 14" x 19", slatted for sure-footed safety.
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Heavy rung back construction permits use by helpers.
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two were amblyopes, four had cataracts, one choroditis, and two had corneal scar tissue from old eye injuries that interfered with their vision.

A number of foremen and other supervisory personnel at this plant were found to be in need of visual care. In fact, many areas requiring excellent visual skills had the highest percentage of persons working with vision below standards set for their jobs.

In the four months prior to the vision conservation program there were 53 injuries in the plant; of this number 12 (23 per cent of the total) were eye injuries. However, during the next five months out of a total of 60 injuries sustained, only five (8 per cent) were eye injuries—a reduction of 42 per cent.

In the summer of 1957, a safety engineer was appointed to start a general safety program. He instituted a policy that helped the vision conservation program by making everyone in the plant safety conscious:

1. Keeping records on all accidents.
2. Meeting once weekly with supervisors to discuss the safety program.
3. Meeting once weekly with four union members to discuss safety.
4. Awarding a $25 U. S. Savings Bond monthly by the company. Every employee in a department without an injury during the previous month is eligible for the drawing.
5. Placing safety posters on the bulletin board.
6. Erecting a large sign at the entrance of the plant stating the number of days without a disabling injury.
7. Establishing a 100 per cent safety shoe policy.

Constant professional supervision by the vision consultant makes the program effective. This includes responsibility for operation of the vision-testing instrument, referrals, recommendations for proper protective eyewear, guidance on specific and general visual problems related to jobs in the plant, contact and ordering with ophthalmic laboratories and liaison with vision specialists in the community. There are also continual professional services to adjust, fit, and maintain protective eyewear.

A LIFESAVER FOR WORKMEN ON

- POLES
- BUILDINGS
- RADIO, TV, HIGHLINE TOWERS
- TANKS
- STACKS
- DERRICKS
- OR ANY OTHER HIGH PLACES

TULITO
SAFETY CLAMP
(Patented. Other Patents Pending)

LOCKS INSTANTLY!
Absolute Safety Assured

Forget the dangers of high climbing ...use TULITO SAFETY CLAMPS. Thousands are now in use on every type of structure.

FULLY APPROVED BY INDUSTRIAL COMMISSIONERS AND SAFETY ENGINEERS.

MEYER MACHINE, INC.
137 Bluff Street Red Wing, Minnesota

Circle Item No. 57—Reader Service Card

SAFER HANDLING
of INDUSTRIAL LIQUIDS!

Eliminate in-plant accidents caused by slick floors and spilled inflammables! This TOKHEIM Hand Pump, for use on drums or skid-tanks, has 8′ hose—or spout outlet—prevents dangerous, wasteful slopping of oils and many other liquids. Speeds production. Pumps 20 gallons per 100 strokes. Ask your dealer, your Tokheim representative or write for list of liquids.

TOKHEIM HAND PUMPS

General Products Division
TOKHEIM CORPORATION
DESIGNERS AND BUILDERS OF SUPERIOR EQUIPMENT SINCE 1901
1670 Wabash Avenue Fort Wayne 1, Ind.

Subsidiaries: Tokheim N.V., Leiden, Holland—GenPro, Inc., Shelbyville, Ind.
Factory Branch: 475 Ninth Street, San Francisco 3, California
In Canada: Tokheim-Reeder of Canada, Ltd., 205 Yonge St., Toronto, Ont.

Circle Item No. 58—Reader Service Card

WHAT'S NEW
IN
NATIONAL SAFETY COUNCIL SERVICES*

Materials Handling Booklet

Easy does it is the byword where industrial materials handling is concerned. And how to do it that way is told in a recent National Safety Council publication—"Easy Does It."

The pamphlet reports that one out of every four work injuries results from moving objects.

What can happen if you handle materials incorrectly? Wrenched backs, pulled muscles, smashed fingers and toes, cuts and burns, according to the multi-colored pamphlets.

Included in "Easy Does It" are tips on how to pile and lift, plus rules for driving power trucks.

New Data Sheets

The following data sheets are now available from the National Safety Council:

D-265 (Revised) Wool Pickers
D-407 (Revised) Methanol
D-463 Handling Large-Diameter Oil Field Pipe
D-467 Setup and Removal of Forging Hammer Dies

These four data sheets, two of which are revisions of former data sheets of the same name, were published recently, but were not printed in NATIONAL SAFETY NEWS.

The new "Index of Data Sheets," revised to include current material, is also available.

*Look to this page each month for latest news about NSC services. Address request for additional information, samples, or prices to the Membership Service Division.

For a More Successful Poster Program

POSTERS illustrated on the following pages are new, and actually are printed in two or more colors. NOTE: (1) Since a new 1959 poster directory is now under preparation, selections from the wide variety of 1958 Directory-listed subjects will be filled only as long as stocks are available. Additional printings may be made if the demand makes it economically practical. (2) Most posters appearing in NATIONAL SAFETY NEWS in 1958 will be stocked until October 1, 1959.

JUMBO POSTER FOR JANUARY, 1959

The Jumbo poster, issued monthly, is designed for outdoor use and is available to members on annual subscription but is not stocked. Its actual size is 9' 11" by 11' 8".

SAFETY BANNER FOR JANUARY, 1959

Here is the attention-getting, monthly cloth banner. Available in two types—indoor and outdoor—both are identical in size (10 feet long by 40 inches high), have the same general message and multi-color design. Indoor type is of sturdy drill with grommets for easy hanging, while the outdoor banner is of extra heavy drill with wind vents, and has strong stitched-in rope for durability.

1478-A 8½x11½

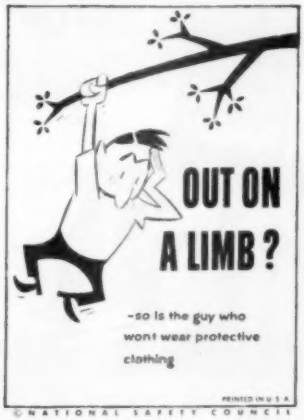
This new four color poster is illustrative of the 72 four color posters shown in the 1958 Poster Directory.

Electrotypes of poster miniatures on this page are not available, nor can payroll inserts be supplied.

Posters below are printed in two or more colors

(Available only in sizes indicated)

1434-B 17x23



1495-A 8½x11½

1448-A 8½x11½

1287-A 8½x11½

1406-B 17x23

1342-A 8½x11½

1375-A 8½x11½

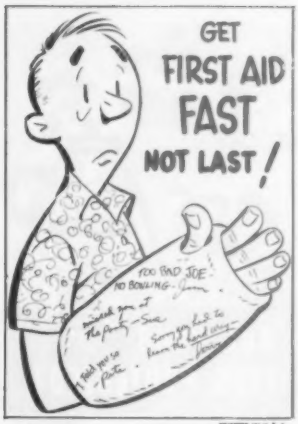
1357-A 8½x11½

1529-A 8½x11½

Electrotypes can be furnished for all posters illustrated above.

Posters below are printed in two or more colors

(Available only in sizes indicated)



©NATIONAL SAFETY COUNCIL

1485-A 8½x11½

©NATIONAL SAFETY COUNCIL

1438-B 17x23

©NATIONAL SAFETY COUNCIL

1499-A 8½x11½

©NATIONAL SAFETY COUNCIL

T-1480-C 25x38
T-1481-A 8½x11½

©NATIONAL SAFETY COUNCIL

V-1488-B 17x23

©NATIONAL SAFETY COUNCIL

V-1487-B 17x23

POSTER ORDER FORM

SHIP TO:

*Organization*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

*To attn. of*_____

SEND INVOICE TO:

*Organization*_____

*Address*_____

*City*_____ *Zone*_____ *State*_____

*To attn. of*_____

ORDERED BY_____

*Customer's P.O. Number*_____

PRICES EACH	"A" SIZE (ALL)	"B" SIZE (EXCEPT PREFIX T-)	"B" SIZE (PREFIXED WITH T-)	"C" SIZE
1-9	$ .15	$ .30	$ .25	$ .35
10-99	.092	.22	.18	.27
100-999	.063	.185	.15	.22
1,000-4,999	.052	.15	.12	.20

Prices subject to 10% discount to members. Quantity prices apply only on a single shipment to one location.

Quantity	Poster No.	Quantity	Poster No.

ADDRESS ORDER TO: NATIONAL SAFETY COUNCIL, 425 N. MICHIGAN AVE., CHICAGO 11, ILLINOIS

Electrotypes can be furnished for all posters illustrated above.

Buried Metal Corrosion

—*From page 31*

steels, exhibit the controlling influence of the soil on the character of the corrosion. All the plain ferrous materials showed similar corrosion patterns when buried in the same soil, but the type of corrosion varied widely in different soils. In general, a high initial corrosion rate, decreasing after a few years to almost complete cessation, is found in well-drained soils with high resistivities; the corrosion rate is nearly constant after the first year or two in poorly-drained soils with low resistivities.

Alloy steels and irons. Data were obtained on the following low-alloy steels: copper-bearing steel, copper-molybdenum open-hearth iron, nickel-copper steels, and steels containing from 1 to 6 per cent chromium with and without molybdenum.

The general effect of the alloying elements was to lower the initial rate of weight loss, but to increase the initial rate of pitting, as compared with plain carbon steel. Except in poorly-aerated and reducing soils, the pitting rate diminished more rapidly for alloy steels than for plain steels. Chromium and molybdenum were particularly effective in reducing the corrosion of low-alloy steels in the most corrosive site, a cinder fill.

Higher-alloy steels tested contained up to 18 per cent chromium, with and without nickel and molybdenum. Increasing the chromium content caused a gradual decrease in weight loss, but pitting was accelerated by additions of chromium beyond 6 per cent. The tendency of high concentrations of chromium to accelerate pitting appears to be neutralized by adding sufficient nickel to produce steels of the austenitic type.

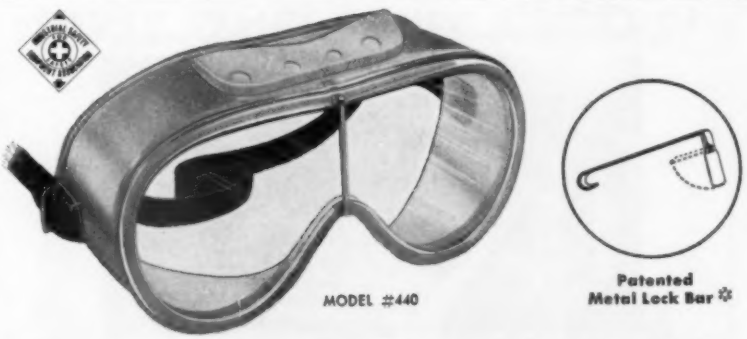
Field tests on low-alloy cast irons, containing up to 3 per cent of nickel with and without copper, showed the presence of such amounts of nickel or copper had no significant effect in any of the soils up to the amounts used.

Copper, brass, and lead. Results on copper and copper alloys indicate tough-pitch copper, deoxidized copper, copper containing

Circle Item No. 59—Reader Service Card

ICE-FOE
WITH THERMOLYTE
SPEEDILY MELTS
ICE AND SNOW

Economical 100-lb. drums at your sanitary supply jobber—or write
WALTON-MARCH
Highland Park, Ill.



Soft Vinyl COVER GOGGLES

***Lens is held firmly** in place by strong metal lock bar. Annealed end piece on the lock bar can be lifted with a fingertip for quick, easy lens replacement.

MODEL #440 provides all-around protection against heavy-impact, chemical splash, dust, sparks or molten metal. Soft vinyl frame form-fits any shape face. #440 is large size which fits over any prescription glasses.

MODEL #440M provides a snug fit for medium and small size faces. It supplements the large #440 to end all cover goggle problems.

For details, see your authorized EYE SAVERS supplier or write direct.

WATCHEMOKET OPTICAL CO., INC.
232 West Exchange Street
Providence 3, R. I.

Quality Eye Protective Equipment — *Made by the Leaders in Plastics*

Circle Item No. 60—Reader Service Card

up to 3 per cent of silicon with and without tin, and red brass (15 per cent Zn) behave essentially alike. Soils, including cinders, with high concentrations of sulfides, chlorides, or hydrogen ions, were found the most corrosive toward these materials.

The corrosion rate of Cu-Zn alloys with more than 27 per cent zinc increased approximately as the amount of zinc and was generally accompanied by dezincification—except in soils with moderate or high concentrations of sulfide. In the sulfide soils the corrosion rate decreased with greater zinc content and dezincification did not occur.

Chemical, antimonial, and tellurium lead showed no appreciable differences in corrosion behavior. The corrosion rate of each tends to increase with decreasing aeration of the soil. Organic acidity was corrosive; but in soils high in sulfates, chlorides, or carbonates, the corrosion products formed a protective coating.

Metals compared. To compare the corrosion resistances of plain iron and steels, copper, lead, and zinc, soils were divided into four groups: well-aerated, poorly-aerated, alkaline, and high in sulfide or sulfate. When corrosion-time curves were plotted for specimens buried in soils of these types, it was found plain iron or steel corroded more rapidly than other metals in all soils except the one high in sulfate. In this soil zinc corroded more than steel; but only lead could be expected to withstand for long the corrosive action of such a soil.

In soils representative of most of the United States, copper showed the highest corrosion resistance. This superiority is especially marked in the poorly-aerated environment, where the corrosion rates of iron or steel, zinc, and lead are proportional to time. In well-aerated soil, rates of corrosion of the same metals decreased rapidly with longer exposure.

Coatings, asbestos-cement pipe. Field tests on galvanized coatings over iron and steel showed a 2-oz/ft coating of zinc was sufficient protection in inorganic oxidizing soils, 3-oz/ft was needed in inorganic reducing soils, and still heavier coatings in high reducing organic soils. For steel coated with lead and copper coated with tin, both by hot-dip process, it was found in many soils the local corrosion is much deeper than the thickness of generally available commercial coatings.

Coatings of vitreous or porcelain enamel revealed no signs of deterioration in 14 years' exposure. Baked phenolic coatings showed marked superiority to air-dried phenolic coatings in preventing pit information in the underlying steel. Rubber and rubber-like coatings were also successful, mainly because of their large thicknesses. Numerous other organic coatings failed to give adequate protection because of insufficient thickness or unsatisfactory bonding between metal and coating.

Extensive field tests were made

Circle Item No. 61—Reader Service Card

Maximum guard rail safety...
Minimum construction cost
with **SPEED-RAIL SLIP-ON FITTINGS**
• no threading • no welding
• up to 30% saving

It's been proved many times that safety guard rails and balustrades built with Speed-Rail structural pipe fittings will save construction time and money. These unique fittings are simply slipped onto standard I.P.S. pipe and the set screws tightened with a hex wrench. Costly threading and welding are eliminated, pipe-cutting is reduced to a minimum.

Speed-Rail Fittings are fully tested for strength using 100% safety factor so they assure maximum protection. They are made of high-strength aluminum and can be installed outdoors or indoors.

Leading distributors stock Speed-Rail Fittings, and also Nu-Rail Fittings. Literature and technical information will be furnished for any application; write Dept. 16-S.

THE HOLLAENDER MANUFACTURING CO., 3841 Spring Grove Ave., Cincinnati 23, Ohio

This is it! MAKE QUIET AREAS AT LOW COST with E. H. Noise Reduction Panels

E. H. Panels are 4 x 8' for easy building.

Here is a real contribution to industry's need for low cost, soundproof and sound absorptive noise barriers. *Can be cut in the field to any size and shape!* Complete with erection members, soundproof doors and bucks. Write today for complete literature to Dept. 10-S11.

ELOF HANSSON, INC.
Acoustical Division
711 Third Avenue, New York 17, N. Y.

Enclose noisy machinery

Circle Item No. 62—Reader Service Card

on all bituminous coating materials commercially available (1929-32), including shields, wrappings, and reinforcing materials. As a result of these experiments, performed with the cooperation of the American Gas Association and the American Petroleum Institute, improved methods of applying the coatings were developed, and new specifications for bituminous coatings were adopted by the industry.

Pipes of asbestos-cement, now widely used for transporting water, showed an increase in strength during the first few years due to the curing process that cement products normally undergo in moist atmospheres. After completion of this curing period, there was a loss in strength, a decrease in apparent specific gravity, increased water absorption, and softening of the surface. These effects were accelerated by organic and inorganic acidity in the soils.

Cathodic protection has come into extensive use as an alternative or supplement to protective coatings. The method consists in impressing electromotive forces on the underground structure so the entire structure remains cathodic to the soil at all times. This prevents positive metal ions from passing into solution, and blocks the corrosion reaction.

If electric power is available, it is converted to direct current and auxiliary anodes of scrap iron, graphite, or other material are used to carry the current into the earth. Where power is not easily available, aluminum, magnesium, or zinc is used for sacrificial anodes to supply the needed emf by galvanic action.

REFERENCES

A list of publications on underground corrosion, cathodic protection, and stray-current electrolysis is given in *List of Publications LP7*, obtainable from the Publications Section, National Bureau of Standards, Washington 25, D. C.

A comprehensive survey of Bureau research in this field is given in NBS Circular 579, *Underground Corrosion*, by M. Romanoff, 1957. Available from the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C., Price $3.

Circle Item No. 63—Reader Service Card

Be protected against ALL respiratory emergencies

with STEPHENSON "MINUTEMAN" RESUSCITATORS

This equipment combines the functions of resuscitator, inhalator and aspirator in one compact (30 lbs. with cylinder) instrument. Therefore, its usefulness is not confined to cases where the patient is still able to breathe fairly well, as is true with the inhalator. In addition, the MINUTEMAN, actually performs the breathing act for the patient in a condition of apnea (partial or complete suspension of respiration).

Once voluntary respiration is substantially restored, the MINUTEMAN operates as an inhalator. If the patient's air passages are clogged with mucus, blood or other foreign matter, they can be quickly cleared with the aspirator. The MINUTEMAN gives excellent results in cases of smoke or fume suffocation, heart attack, electric shock, drowning, etc.

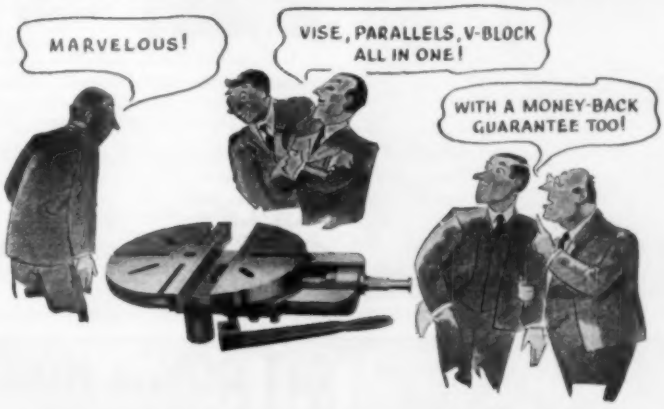
Its simplified design enables even an inexperienced person to operate the MINUTEMAN in a crisis when every second counts. The instrument can be used for all patients from small infants to adults.

Write or telephone today for folder F-505 or for demonstration by neighboring sales representative.

STEPHENSON CORPORATION
RED BANK NEW JERSEY

Represented in Canada by Wilson & Cousins, Toronto

SAVES TIME! SAVES FINGERS!



MODERN Safety Drill Table!

FREE TRIAL OFFER
write for full details!

The handiest, fastest, safest way to make drilling set-ups! Just drop in and drill — all shapes — all sizes. We guarantee it will save its cost in labor alone in six months—to say nothing of the savings from uninterrupted production. We'll put one in your shop for 30 days. Not one penny cost to you if you aren't enthusiastic. Literature on request.

MODERN MACHINE TOOL CO.
2005 LOSEY AVENUE
Jackson, Michigan

Circle Item No. 64—Reader Service Card

Their Toughest Job

—From page 21

ground containers of heavy steel plate house most equipment. One container, hemispherical in shape, 38 ft in diameter, encloses the atomic reactor.

Extending to either side is a cylindrical "hot dog"-shaped container 97 ft long and 50 ft in diameter. These hold the four boilers and their auxiliaries. Adjacent to these boiler containers is a third cylindrical container—147 ft long and 50 ft in diameter—housing auxiliary equipment.

Cramped quarters. The largest percentage of the work was confined inside the containers. All material and equipment going into the containers, regardless of size or weight, was lowered through one of eight hatch holes. A 35-ton stiff-leg derrick was erected at the top of each boiler container for lowering the more unwieldy pieces of equipment—stainless steel heat exchangers, for example, each of which is 36 ft long and weighs about 28 tons. Before they were set in place, a simulated test lift of 35 tons, (25 per cent more than the load to be handled) was performed.

Ventilation. Open hatch holes, aside from providing material access, also served as fresh air inlets. Air was forced down into the confined areas of the containers by fans with canvas ducts attached. Portable suction fans located in the welding areas forced fumes and foul air up to the hatch holes where large stationary suction fans expelled them to the outside.

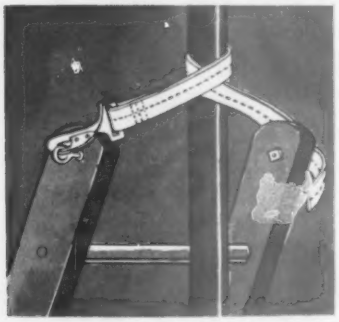
Scaffolding and ladders. The unusual cylindrical shape of certain areas compounded normal dangers connected with scaffolding and ladders. Not only was a large number of them necessary to provide working locations, but because of the cramped work area, scaffolding and ladders had to be moved constantly. In addition to the conventional type of scaffold, complicated temporary walkways were built. These had to be sturdy because of the number of men and the weight of materials supported. Safety checking of these structures was a regular procedure.

Hundreds of men working on different levels, one above another, had to be constantly alert to avoid being struck by material lowered through hatch holes. Low-hanging pipes, scaffolding, and many projections were other obstacles. The hard hat was a "must." Without hard hats, 95 per cent of the men on the job would have received head injuries.

Solvents. Much pipe installed inside the containers was stainless steel and, according to specifications, had to be surgically clean before and during installation. This requirement was met by using acetone and distilled water in a special "clean room" built in the mechanical warehouse.

The low flash point of acetone made it necessary to set up strict rules regarding its use. *No Smok-*

Circle Item No. 65—Reader Service Card



SAFE-HI LADDER LASH NEW STEP UP IN CLIMBING SAFETY . . .

Can Be Used on Horizontal or Vertical Poles or Pipes!

Knotty ladder ropes have finally come to the proverbial "end of their rope" since the invention of Ladder Lash, latest product of Rose Mfg. Co. The Safe-Hi Ladder Lash, a parachute web strap, solidly anchors ladders for high-climbing workmen, ending the hazards of wobbling, tottering ladders. Ladder Lash will anchor on poles up to 20" in diameter making it ideal for utility pole use as well as any other horizontal or vertical poles or pipes.

No Groping in Mid-Air

Ladder Lash does away with top-rung confusion. In one quick motion the strap is wrapped around any horizontal or vertical pole, the forged steel snap is clipped into the swivel eye bolt and the strap is pulled through the adjustment slide until taut. A simple device, Ladder Lash is easily attached to any ladder. Workmen are sure to like the dependable safety features of the Safe-Hi Ladder Lash.

Safe-Hi Pole Grip Adds Extra Safety Feature

Use Ladder Lash and Pole Grip together for the extra measure of safety. Safe-Hi Pole Grip, already favored by "Higher-up's," is made of 4-ply web strap 26"x1¾" wide with a center section of neoprene tread for super gripping strength on vertical poles.

#632—Pole Grip #645—Ladder Lash

Safe-Hi ROSE MANUFACTURING COMPANY
2700 W. Barberry Pl., Denver 4, Colo.

Circle Item No. 66—Reader Service Card

CUT DOWN NOISE
WITH THE S M R
EARSTOPPER

Soft, comfortable, resilient, the SMR EAR STOPPER adjusts itself to all shapes, turns and movements of the ear canal. Tends to anchor itself in the ear. Has a long life and is reasonable in cost. Furnished in a plastic case. Forty-five cents per set in gross lots.

Free sample when requested on company stationery.

SURGICAL MECHANICAL RESEARCH INC
1965 Beverly Blvd., L.A. 57, Calif.
SMR

ing and *Authorized Personnel Only* signs were posted in the area, and all persons entering the clean room had to wear plain white pocketless coveralls, a white hat, gloves, and plastic boots. After cleaning, the pipe was sealed prior to transfer to the installation area. Before welding, each pipe joint was covered with a portable clean room constructed of fire retardant canvas. Acetone and distilled water again were used to clean the weld area.

This operation involved many gallons of acetone, with control maintained by requiring transfer of the solvent from the storage area to the work area in one-quart stainless steel safety cans.

Welding. Grinding stainless steel welds in the containers was a hazard to all personnel there, most of whom were not involved in the grinding process. Such confined areas would not permit the use of protective shields around each operation, and drafts caused by open material access holes carried minute grindings throughout the containers. Although protective goggles and face shields were used, there were many minor eye cases attributable to flying particles of dust or stainless steel.

X-rays of completed stainless steel welds were taken with an Iridium 192 source. When possible, these x-rays were made during off-shift hours, but due to tight scheduling, some had to be obtained in regular work hours. This practice required strict regulations concerning use of the source.

Regardless of the time the x-rays were taken, the immediate area of exposure was roped off at a safe distance determined by a radiation meter. Radiation warning signs were posted, and the operator stood by to warn any employee who might disregard the signs. Construction personnel were reminded at safety meetings about the meaning of the rope and signs and of possible consequences. During the entire construction period, thousands of exposures were made without injury.

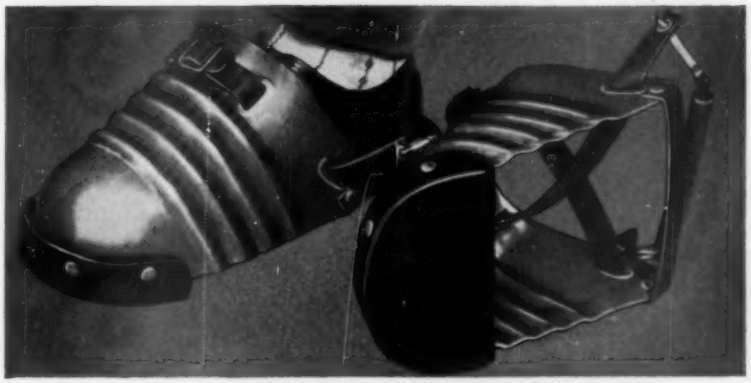
Two crews of men kept the construction area clear of debris, and free from fire and accident hazards. The sole duty of these crews was to carry waste material outside for disposal. In addition, one man was assigned to each of the four containers for general housekeeping purposes; during peak construction more men were required to do the job satisfactorily.

Fire protection. The system installed in the area included standpipes placed in nine different locations with 150 ft. of 1½-in. fire hose and a combination fog-stream nozzle attached to each outlet. These were spaced to put three hose lines into service immediately, if needed.

Fire alarm boxes were installed at four locations with alarm switches and outlets for emergency lighting. A special circuit powered this system independently of temporary power supplied to the containers. Signs posted near each alarm box indicated the signal to be sounded to designate the area on fire. Direct telephone connections from the containers to the administra-

Circle Item No. 67—Reader Service Card

FOOT-TOE-LEG Protection by "Sankey"



"SANKEY" IMPROVED FOOT GUARD

The metal shield (above) is designed to furnish a maximum amount of protection to the entire front of the foot—not merely the toes alone, but also to the instep against hazards from falling, rolling or flying objects, or from accidental tool blows.

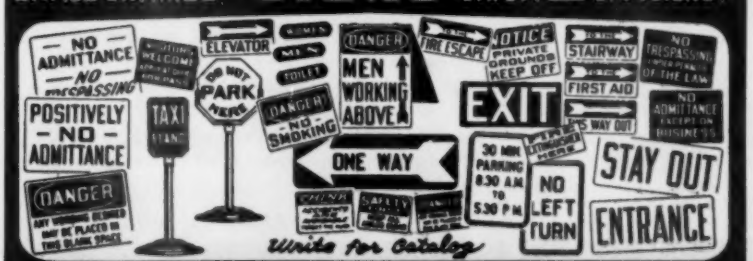
- Absolute freedom of leg motion, utmost protection and comfort come with the leg-contour shaped "Sankey" fibre shin guard (right).
- Fibre knee-shin guard (right) provides flexible knee movement on jobs with both knee and shin hazards.

For more information write today

ELLWOOD SAFETY APPLIANCE CO.

225 SIXTH ST. — NSC ELLWOOD CITY, PA.

Weathertite BAKED ENAMEL **SIGNS** STANDARD REGULATION SIGNS OF ALL KINDS FOR SAFETY AND EFFICIENCY



Write for catalog

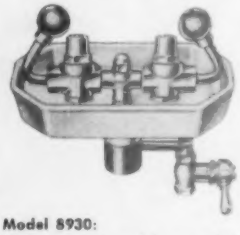
PRAIRIE STATE PRODUCTS CO. 3822 LAWRENCE AVE. CHICAGO 25, ILL.

Circle Item No. 68—Reader Service Card

Circle Item No. 69—Reader Service Card

Protect Eyes

with **HAWS EMERGENCY EYE-WASH FOUNTAINS**



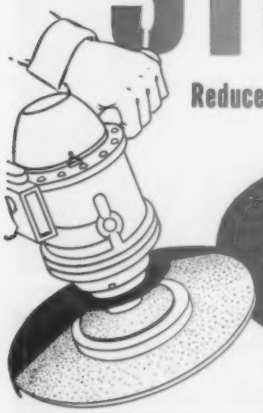
Model 8930:
Basic eye-wash model; enameled iron bowl, chrome plated brass heads. HAWS also offers eye and face wash fountains and drench showers.

Chemicals, foreign particles, caustics — all mean DANGER to eyes! Instant relief is vital! HAWS Eye-Wash Fountains flood the eyes with controlled water streams — soothing, relieving until medical aid arrives. Fool-proof operation activates fountain instantly, possibly avoiding permanent injury. HAWS Emergency Facilities are also widely used for routine cleansing of eyes as a precautionary measure. Write today for illustrated literature on HAWS complete line of emergency facilities.

HAWS DRINKING FAUCET CO.
(Since 1909)
1443 FOURTH STREET
BERKELEY 10, CALIFORNIA

STOP COSTLY ACCIDENTS

Reduce Insurance Costs • Cut Time Loss • Save Lives!



install & use *NEW* MORRISON
STANDARD WHEEL GUARDS
. . . on your portable tools

STOP costly accidents with MORRISON Standard Wheel Guards! Safety codes and laws REQUIRE guard protection. Specify MORRISON for maximum safety . . . lighter weight . . . lower cost . . . greater strength. Full protection for operator with minimum interference with work.

Remember, MORRISON also makes revolving cup guards. There is a MORRISON Guard for every application . . . all are made to comply with American Standard Safety Code.

SEE YOUR GRINDING WHEEL SUPPLIER OR WRITE:

MORRISON PRODUCTS INC. 16816 Waterloo Road, Cleveland 10, Ohio

Circle Item No. 70—Reader Service Card

tion building switchboard helped to spread the alarm.

A 22-man fire brigade, composed of men from each craft, trained to use fire equipment. These employees received training in instruction periods during regular working hours. The brigade also received guidance in elementary first aid. They learned pressure points, artificial respiration, and stretcher-bearing, and became capable of assisting in most emergencies.

Permanent fire guards protected designated areas. Their duties included checking all welding and burning operations, reporting fire and accident hazards, and inspecting and maintaining fire fighting equipment. The guards inspected standpipes, hose, and alarm boxes. About 120 dry chemical and water pump extinguishers were on hand.

These men also checked x-ray areas to make certain that ropes and signs were in place and to help the operator warn away employees, if more than one entrance was adjacent to the area.

Medical Service. The dispensary employed three registered nurses to treat injuries sustained by any of the 1,700 people working during the peak period. These nurses treated about 5,000 first-aid, repeat, and non-industrial cases. Assisted by four local doctors, each a specialist, the medical professionals helped maintain the low severity rate on the project.

Visitors. Because of the pioneering aspect of the Shippingport project, large numbers of visitors came to the job site. Protecting these people in an environment unfamiliar to many of them was a difficult problem. Each visitor or group (equipped with hard hats) was accompanied by one or more regular employees, usually from the engineering staff, after a briefing on plant layout. No known mishaps involved a visitor.

* * *

The safety record achieved at Shippingport indicates the most hazardous projects need not take a heavy toll in injuries when hazards are recognized, precautions taken, and personnel educated in the safe performance of their jobs.

PERSONALS

News of people in safety and related activities

NFPA Appointments

The National Fire Protection Association announces the appointment of new chairmen for five of its technical committees:

J. HOWARD MYERS, Atlantic Refining Company, Philadelphia, heads the sectional committee on Transportation of Flammable Liquids. J. E. TROUTMAN, Factory Insurance Association, Hartford, Conn., is chairman of the committee on Atomic Energy. J. R. DE HAVEN, Employers Mutual Fire Insurance Company, Wausau, Wis., heads the committee on Dehydrators and Driers. F. C. SAACKE, Air Reduction Company, New York, heads the committee on Cutting and Welding Practices. C. L. JONES, Hercules Powder Company, Wilmington, Del., chairs the sectional committee on Coating Manufacture.

Ford Safety Appointments

Creation of an industrial safety section comprising safety, industrial hygiene and workmen's compensation, and appointment of JACK C. RADCLIFFE as its supervisor, have been announced by Robert T. Ross, manager of employee services for Ford Motor Company.

Prior to his new appointment, Mr. Radcliffe was supervisor of the company's industrial hygiene unit. He joined Ford in that capacity in 1947.

RAYMOND D. HARVEY will serve as safety director, administering company-wide safety activities.

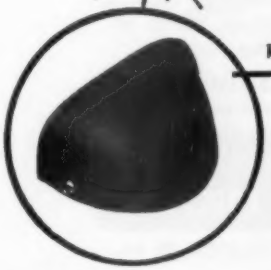
Mr. Harvey was born January 28, 1906, in Ithaca, Mich., and attended Eastern Michigan College and Wayne State University.

He joined the Ford safety department in 1932 and remained until 1941 when he left to become safety director for Murray Corporation. Returning to Ford in 1954 as assistant safety director he was

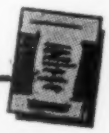
. . . AND IT FELL ON HIS COMPROMISE

The finest in foot protection is a pair of safety shoes, but you probably have at least one man in your plant who doesn't wear them.

For him the best compromise is StaSafe Toe Clips, impact resistant steel clips that can be permanently nailed or temporarily fastened directly to his work shoes. Lightweight and low cost StaSafe Toe Clips combine comfort with protection.



Write in Today for Toe Clip Bulletin



Standard Safety Equipment Co.
431 North Quentin Road, Palatine, Illinois
604 Broadway, Newark 4, New Jersey
855 East 152nd Street, Cleveland 10, Ohio
12921 Washington Boulevard, Los Angeles 66, Calif.

Take the hazard out of Floor Maintenance

WITH HOLT EXPLOSION PROOF COMMANDER

Holt Commander is designed expressly for safe maintenance of floors in oil refineries, atomic research plants, powder factories, and other hazardous industries. There's no outside wiring. Entire unit, from brush to handgrip, is constructed, sealed and safety-tested to prevent sparks and static that might ignite gas, dust, fumes or vapors. Static eliminator wire in brush, a Holt exclusive, even prevents shocks to operator.

With this one machine and Holt Quick-Change Attachments you do a complete floor maintenance job — polish, wax, buff, scrub, etc. Dual handles give operator better control; reduce fatigue. Made in 16 and 20" sizes. For full story write now to Dept. W11.

Sales and Service Centers in Major Cities

32

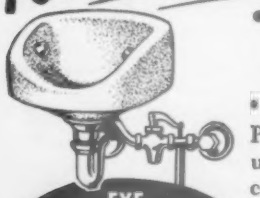
HOLT MANUFACTURING CO.
BETTER FLOOR MACHINES FOR MORE THAN 30 YEARS

669 - 20th St., Oakland 12, Calif., or 272 Badger Ave., Newark 8, N. J.

Circle Item No. 71—Reader Service Card

Circle Item No. 72—Reader Service Card

FOR CHEMICAL BURNS
... CLOTHES ON FIRE



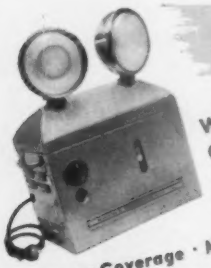
• EYE WASHING FOUNTAIN
Provides a first-aid procedure recommended by medical authorities in the event of any chemical in the eyes.

EMERGENCY SHOWER

• EMERGENCY SHOWER
Permits an individual to thoroughly drench himself with gallons of water simply by leaning against operating chain which attaches to floor.

WRITE FOR BULLETIN NO. 86 for Information on Both Items

IPCO
Safety Equipment for all Industries
INDUSTRIAL PRODUCTS COMPANY
2850 N. FOURTH STREET • PHILADELPHIA 33, PA.



WHEN POWER FAILS . . .
ONLY
WATCHMASTER Automatalites
have all these advantages

Maximum Coverage · Minimum Maintenance · Consistent Dependability

★ CARPENTER COMPONENTS, exclusively, are specifically designed for emergency lighting applications . . . heavy duty, rugged, dependable
★ DOUBLE INTENSITY from large parabolic reflector lampheads . . . greater coverage from fewer units
★ FASTER RECHARGE with complete safety. Assures full protection even with several successive power failures
★ HYDROCAPS . . . proven catalytic device to reduce water loss . . . add water only every year or two . . . prevents messy corrosion . . . prolongs battery life
★ PLUS . . . U/L, city and state approvals . . . auto-timer to prevent overcharging . . . distinctive functional styling . . . completely self-contained . . . automatically activated by all types of power failures

NEVER SETTLE FOR LESS!

OVER 100 LIGHTS for every emergency need

NOW AVAILABLE:
1. Specification Sheets with complete data
2. Consultation Service to help plan your protection
3. Complete catalog of over 100 Carpenter-Lights

Explosion-Proof Lights
for hazardous areas where vapors, gases, or dust preclude use of standard units. Send for details.

CARPENTER MFG. COMPANY
426 BRADLEY STREET, SOMERVILLE 45, MASS.

WRITE TODAY

Circle Item No. 73—Reader Service Card

named to his present position in September 1958. He succeeds William S. Smith who retired August 31 after more than 35 years of Ford service.

Mr. Harvey is currently president of the Detroit chapter of the American Society of Safety Engineers. He has taught college classes in industrial safety and has been director of the Detroit Industrial Safety Council and a member of the executive committee of the National Safety Council's Automotive and Machine Shop Section.

CLARENCE E. CAROTHERS, who joined Ford in 1930 and has served in various industrial relations supervisory assignments, will continue to administer workmen's compensation activities.

Batley Retires

JOHN A. BATLEY, JR., civilian safety director for the Ordnance Corps, retired September 30, 1958, after more than 30 years of government service.

Mr. Batley has served as principal authority and technical adviser for the Ordnance Corps on safety of ammunition, explosives, guided missiles, special weapons, and industrial operations. He planned and directed the Ordnance Corps safety program involving more than 100 field installations. He has also served as the alternate Department of the Army voting member on the Armed Services Explosives Safety Board.

Was Explosives Consultant

He provided safety advice surveys of privately-owned, privately-operated companies manufacturing explosives, ammunition, and pyrotechnics under Ordnance contracts. He assisted in the design of Army Defense tactical guided missile sites, and acted as safety consultant to friendly foreign governments.

Mr. Batley has received a number of commendation awards during his service with Army Ordnance, and has repeatedly received "outstanding" performance ratings. For six consecutive years (1951-1956), the Ordnance Corps

received the National Safety Council Award of Honor or the Department of the Army Award of Merit for Safety. No other technical service or army command has achieved this record.

Another accomplishment involved marked reductions in accident insurance costs to contractors operating Ordnance installations. For example, the National Defense Project Rating Plan accident insurance savings for about 16 Ordnance contractor-operated plants manufacturing ammunition amounted to $15,912,-999 for 1951 to 1953. These big savings have continued each year, resulting in the reduction of insurance premiums by 45 per cent.

Developed Standards

Another of Mr. Batley's accomplishments was the continued development of the Ordnance Safety Manual, considered to contain the best available standards on explosives safety in the United States. These standards have been adopted by the State of Illinois and are frequently requested by foreign countries.

At the request of the Swedish government, Mr. Batley visited Sweden in December 1954 to assist in determination of the cause of an explosion. Official acknowledgement of appreciation of Mr. Batley's assistance has been received.

Culbertson to Hot Shoppes

CHARLES V. CULBERTSON, formerly headquarters staff safety engineer in charge of industrial safety and fire prevention for the Post Office Department has become director of accident prevention and insurance for the Hot Shoppes Inc., Washington, D. C.

Hot Shoppes Inc. is a national restaurant, hotel, and airlines catering organization with 75 operations in 13 states along the Atlantic Seaboard and throughout the Midwest.

Mr. Culbertson is a graduate mechanical engineer from Purdue and in 1950 was the first graduate student at Georgia Tech to receive a master's degree in safety engineering. His early safety ex-

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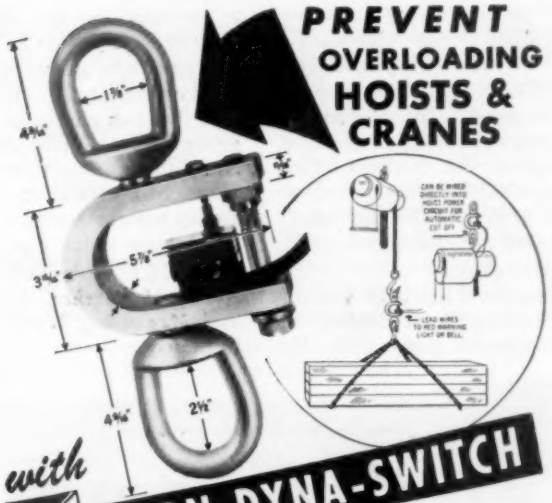
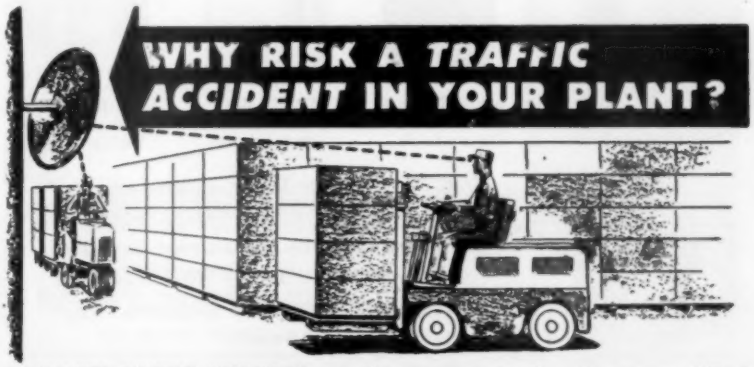


When load limit is exceeded, Dyna-Switch trips a sensitive micro-switch which may be connected to a warning bell or light. If Dyna-Switch is connected into the motor, the overload automatically cuts motor out, and load must be returned to floor and surplus weight removed before pickup can be completed.

Top working range is 20,000 lbs. Set at factory for any desired cutout point, but can also be re-set in the field if working conditions change. Low in cost—always on guard. Write or wire today for illustrated bulletin.

W. C. DILLON & CO., INC.

14614 Keswick St., Van Nuys 11, Calif.



KLEAR-VU SAFETY MIRRORS are the answer to the dangerous blind corner problem in your plant or warehouse. They are also adaptable for outdoor use in your parking lot, loading dock area or other points where traffic converges.

Mounted at cross aisle intersections, entrances and exits at a height of 8 to 10 feet, Klear-Vu Safety Mirrors clearly reflect oncoming intersection traffic to both power truck operators and pedestrians.

Style	No.	Dimensions
Circular Convex Glass	120	12" dia.
Circular Convex Glass	180	18" dia.
Circular Convex Glass	240	24" dia.
Circular Convex Glass	300M.R.	30" dia.
Circular Convex Glass	360M.R.	36" dia.
Flat Glass Rectangular	918	9"x18"
Flat Glass Rectangular	1640	16"x24"

M.R. indicates metal rim.

Available in either convex or flat glass styles, the mirrors are easily installed and quickly adjustable to any desired angle.

Special sizes made to order, Polished flat metal mirrors available.

LESTER L. BROSSARD CO.

540 N. MICHIGAN AVE., CHICAGO 11, ILL.

Write for Bulletin.

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perience was as a safety inspector with the Ford Motor Company's Rouge Plant. He then joined The Drackett Company, Cincinnati, as safety engineer. In November 1954 he was appointed as regional safety engineer for the Post Office Department's Cincinnati region and was promoted to the headquarters staff at Washington, D. C. in December 1955.

Mr. Culbertson has been a member of the American Society of Safety Engineers since 1950. He is serving on the Montgomery County Safety Board (Maryland), and has been active with numerous civic safety groups. This past year he was chairman of a study group serving under the American Standards Association Z16.1 Review Subcommittee, which recently recommended a new injury experience index for adoption in the Z16.1 Standard, *American Standard Method of Recording and Measuring Work Injury Experience.*

Circle Item No. 76—Reader Service Card

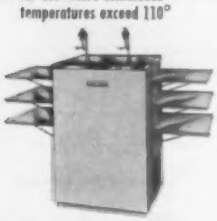
Halsey Taylor® offers a wide variety of newly styled health-safe coolers

EXPLOSION-PROOF model for use where continuous temperatures exceed 110°

COMBINATION High and Low-Level for use of children and adults

STAINLESS STEEL Cabinets to fit any modern decor

LOW-LEVEL type for schools and wherever "small fry" gather

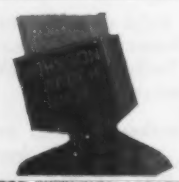


CAFETERIA type for factory and restaurant use

You'll find Halsey Taylor coolers just right for commercial or industrial applications. They are available in air-cooled or water-cooled models, with sturdy life-time cabinets and sanitary two-stream projectors. Write for catalog or see Sweet's.

The Halsey W. Taylor Co., Warren, Ohio

93



FOR EXTENSION LADDERS

"PROTECT YOUR CLIMBERS"

With Johnson All Rubber Ankle Action Dielectric Ladder Shoes. The Choice of Ladder Climbers in all parts of the world.

WORK SAFELY ALL-WAYS

FOR STEP LADDERS

Our Step Ladder Shoes are popular with maintenance men in homes, office buildings, schools, hospitals and etc. Dealers in all principal cities. Ask your Safety Supply Dealer or send direct. Your order will be shipped promptly.

JOHNSON LADDER SHOE INC. EAU CLAIRE, WISCONSIN

Circle Item No. 77—Reader Service Card

Obituary

J. W. STONEHOUSE

JAMES WESLEY STONEHOUSE, founder of Stonehouse Signs, Inc., of Denver, Colo., died September 30 in Los Angeles. He was 89 years old. Mr. Stonehouse founded his company, specializing in accident prevention signs for industry, in 1913.

Mr. Stonehouse designed the original octagonal traffic sign, now universally recognized. Largely through his efforts, accident prevention signs today are standardized in shape and color to readily identify the various kinds of hazards.

In 1926, due to ill health, Mr. Stonehouse relinquished the presidency of the Stonehouse Sign Company to Mrs. Stonehouse, who still maintains active control of the business. They moved to Los Angeles several years ago, but the family has remained in close touch with the business.

Mr. Stonehouse is survived by his widow, Mrs. Hutoka A. Stonehouse, and a daughter, Mrs. John Meyer of Pocatello, Idaho.

Surgeon General Calls Air Pollution Conference

Anticipating increased air pollution with the growth of population and industrial expansion, Leroy E. Burney, surgeon general of the Department of Health, Education, and Welfare, Public Health Service, has called for a National Conference on Air Pollution. Open to the public and air pollution control specialists, the conference will take place November 18-20 at the Sheraton-Park Hotel, Washington, D. C.

After the official welcome, the surgeon general will present a "Status Report to the Nation." Industrial and civic leaders will speak on "What Has Been Done," "Social Aspects of Air Pollution," and "The Community's Obligation."

Participants will divide into six discussion groups for all-day sessions on the second day.

Congress Quotes

—*From page 16*

loggers. At the end of two years 70 per cent of the loggers were wearing them. All efforts to get hard hats worn by the remaining 30 per cent had failed.

They needed protection, too. And they were influencing others not to accept the hats. Then, after an accident in which the hat prevented serious injury to a logger, company policy was set up requiring everyone to wear them. And they were accepted by everyone.

—*Joe T. Dunlop, Dierks Forests. (Wood Products)*

Muscle-Moving and Science

"Scientific management" has paid off ever since astute businessmen discovered it. But it still hasn't solved the problem of how to prevent injuries from "muscle-moving."

Handling materials is the main single source of work accidents and injuries in industry. One out of four work injuries stems from materials handling.

Scientific management in business has led to built-in accident prevention measures to minimize the uncertain and unpredictable human factor inherent in all of us.

The achievement of built-in controls in materials handling has been spotty. Hazards and injuries from muscle-moving still remain numerous.

—*Walter J. Byrne, Walter J. Byrne & Co. (Material Handling)*

Ventilation Protects

The *smell* problem in laboratories underlines an increasing need for adequate ventilation in these facilities. All around us are evidences of increased basic research, new methods of quality control and the emphasis on science in our schools and universities.

In our labs, chemists are working with materials of various degrees of hazards and toxicity, and with the growing family of radioactive isotopes.

Especially in the laboratory the safety engineer must have a working knowledge and an appreciation of fundamentals of ventilation and the things ventilation can do to protect and safeguard the worker.

—*James C. Barrett, ventilation engineer, Michigan State Department of Health. (Laboratory Safety)*

Eyes on Power Lines

"Look Up and Live!"

This slogan has been adopted by electric power companies and others to help eliminate deaths and injuries resulting from contact with overhead electric power lines by tools, equipment, and other mobile objects.

If everyone engaged in work that involves raising objects into the air will first look up and then take the proper steps to avoid contacts with any overhead electric power in the vicinity, they and

Circle Item No. 78—Reader Service Card

SAFETY BULLETINS
STOP
COSTLY CAR DERAILMENTS
with a low cost
M & M RAIL CLAMP
The M & M Rail Clamp positively will not slip, so car wheels can't move and cause costly accidents and injuries to employees.
Even heaviest cars are held in position with this small, compact clamp. Its dependability is proven constantly throughout industry—even the heaviest industries—coal, steel, construction, etc.
Write for complete descriptive details.
This advertisement is shown here posted on a Diamond Bulletin Board, another product of Safety First Supply Company.
SAFETY FIRST SUPPLY COMPANY
425 MAGEE STREET • PITTSBURGH 19, PA.

SAFETY
FIRST
YOU CAN USE THIS CHANGEABLE DISPLAY FOR SAFETY FIRE HAZARDS CLEANLINESS PLANT ACTIVITIES AND MANY OTHER MESSAGES

FOR SAFETY'S SAKE . . .
DAV-SON FLASHING SAFETY DIRECTOR
With Amazing Changeable Letter Slide Out Panel

Bright traffic light red, green spots flash "SAFETY FIRST." Color, motion, light bring eyes directly to message. Only DAV-SON has changeable letter design with removable panel for quick changes, peak attention. 98 red 3½" and 250 black 1⅞" acetate letters in compartment box incl. Size 18½x29x6. Complete with lamp and U.L. Cord. $39.75

Insist on genuine self-sealing cork back bulletin boards—hardwood frame. Sizes 12x18 and larger. With or without glass doors. $4.15 up. Also with metal frames for inside or outside use.

A Dav-Son board for every purpose. Over 100 different sizes and styles to choose from. *Dealer Inquiries Invited.*

If your dealer doesn't have the Dav-Son board you need write direct.

WRITE TODAY for big FREE 1958 Catalog

A. C. DAVENPORT & SON, INC., Dept. NSN
311 N. DESPLAINES STREET • CHICAGO 6, ILLINOIS

Circle Item No. 79—Reader Service Card

ARE YOUR TERRAZZO FLOORS

Getting Proper Beauty Care?

The value of your terrazzo floors lies in their beauty. If the wrong type of cleaning material is used on a terrazzo floor, it can mar the finish in a few month's time. Protect your costly floors . . . preserve their original appearance and loveliness with a Huntington Sealer and approved maintenance methods.

To make certain your floors are being maintained correctly and at the lowest practical cost, write for our free booklet "How To Finish and Maintain Hard Floors." Fully illustrated, with step-by-step instructions, it tells your maintenance men the right way to take care of marble, concrete, magnesite and ceramic tile floors . . . to preserve their gleaming beauty for years to come. It can save you many dollars on floor maintenance costs, too.

GET THE FACTS

WRITE FOR FREE BOOKLET

HUNTINGTON LABORATORIES
INCORPORATED
Huntington, Indiana
Philadelphia 35, Pa. • Toronto 2, Ontario

Circle Item No. 80—Reader Service Card

their fellow workers will live to work again.

—Raymond W. White, manager, Claims and Safety Dept., Pacific Gas & Electric Co. (Public Utilities)

Safety Afloat

Keeping a ship safe is only part of the battle. What is more important is the human element.

The most safely designed, constructed, and equipped vessel in the world isn't going to be a good safety bet, if manned with unqualified, unsafe personnel. There can be no argument that skill and qualification for the job are fundamental requisites of safety.

—Vice Admiral Alfred C. Richmond, commandant, U. S. Coast Guard. (Marine)

No Inspections, No Safety

Trying to manage a safety program without safety inspections would be like trying to manage a business without an inspection department. You just can't do it and succeed.

The No. 1 purpose of a safety inspection is to spot unsafe conditions and practices and have them corrected. One important by-product is that inspections help sell safety to employees. A carefully planned inspection program will reduce the number of work injuries.

—Robert Beeson, supervisor of safety and training, Perfect Circle Corp. (Accident Prevention Fundamentals)

Goggles Should Look Good

Vanity plays a big role in selling factory workers on wearing prescription safety goggles.

Unless a factory worker is sold on safety goggles, they're useless. An employee could be provided with the best possible goggle from the standpoint of prescription and safety, and it would be useless unless he wore it at all times when exposed to eye hazards.

The more acceptable goggles are cosmetically, the greater the acceptance.

—Dr. E. J. Schowalter, medical director, Western Electric Co. (Pulp and Paper)

74% USE ŌNOX

to prevent ATHLETE'S FOOT

74 of the 100 Largest Manufacturers Use ŌNOX® SKIN-TOUGHENER

Modern research has upset old theories about Athlete's Foot control. Skin specialists have proved that the best way to prevent Athlete's Foot is to improve the skin's condition. *That's what ŌNOX does.* ŌNOX mineral salts toughen the skin and make it resistant to fungus growth.

- *No Splash*
- *Odorless*
- *Easy to Maintain*
- *Relieves tired, aching feet*

60 DAY TRIAL OFFER
Order any amount of ŌNOX and Footmats. *Pay nothing* unless fully satisfied after 60 days' use.

ŌNOX, INC.
125 SECOND STREET
SAN FRANCISCO 5, CALIFORNIA
Warehouses: BROOKLYN · CLEVELAND
NEW ORLEANS · NEWARK, CALIF.

Circle Item No. 81—Reader Service Card

McDONALD PRODUCTS
Safety Designed...
with comfort in mind!

When it's COLD

it's time for

McDONALD zero hoods

for the original aluminum

SAFETY CAP

SAFETY HAT

ZERO HOOD—Head and ear style as shown in top photos or full head-ear-neck style as above. Really keeps the cold out. Two sizes, medium or large.

WINTER LINING—Makes the safety hat comfortable in the coldest weather. Fleece-lined—easily interchangeable with regular headband.

All McDonald Zero Hoods carry this label

—your assurance of enduring resistance to rain, water-borne stains, wear and wrinkling.

Write for information and prices

B·F·McDonald Co.

Manufacturers & Distributors of Industrial *Safety* Equipment

5721 West 96th St., Los Angeles 45
3745 Greenbriar Drive, Houston 6
Distributed in Canada by
Mine Safety Appliances Co. of Canada, Ltd.

Circle Item No. 82—Reader Service Card

Gasoline in Car Trunk

Don't carry gasoline in your car trunk in cans with spring-loaded valves. It's unsafe. These valves are designed to release the internal pressure in the gas can before structural damage can be done because of temperature increases.

Tests show the hazard of releasing flammable vapor inside a luggage compartment is increased proportionately with the increase in electrical accessories on the vehicle. Electrical devices provide a source of ignition for liberated vapors.

Gasoline, and all other flammable liquids, should always be stored and transported in containers strong enough to prevent leakage.

—Holly P. Bradley, safety supervisor, Service Pipe Line Co. (Petroleum)

Gum to Games

Industrial incentives programs at B. F. Goodrich Co., Akron, Ohio, provide winners with prizes and the company with safety.

This firm supports incentives as a way to further safety and has given away such prizes as all-expense-paid trips to the Kentucky Derby, the Army-Navy football game and World Series baseball games. Other awards have been electric clocks, fruit juicers, fans, electric irons, savings bonds, candy bars, silver dollars and packs of chewing gum.

—H. S. Fryberger, safety advisor, B. F. Goodrich Co. (Rubber)

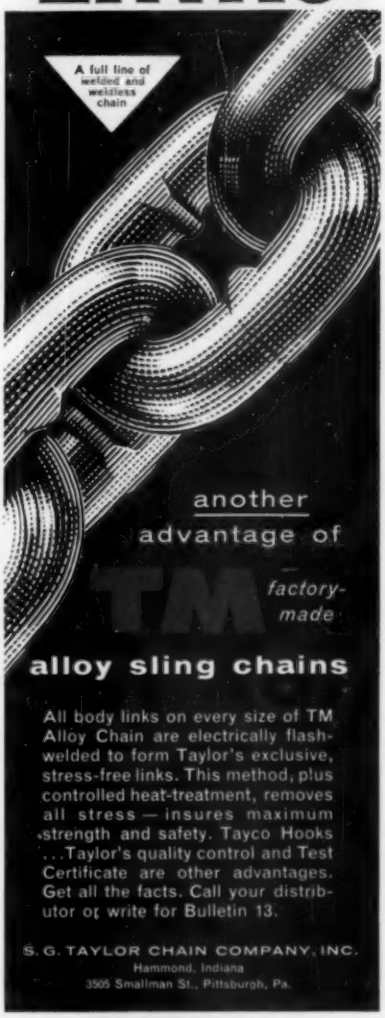
What're You Looking For?

How you investigate an accident depends a lot on what you're looking for. Claims adjusters want to find out who is legally responsible for an accident. Policemen are most concerned over a law violation.

Safety men are interested primarily in why the accident happened, not so much in who was responsible. We study the accident to find out why it happened and to search for a way to prevent a recurrence.

—John B. Creeden, safety engi-

STRESS FREE LINKS



All body links on every size of TM Alloy Chain are electrically flash-welded to form Taylor's exclusive, stress-free links. This method, plus controlled heat-treatment, removes all stress — insures maximum strength and safety. Tayco Hooks . . . Taylor's quality control and Test Certificate are other advantages. Get all the facts. Call your distributor or write for Bulletin 13.

S. G. TAYLOR CHAIN COMPANY, INC.
Hammond, Indiana
3505 Smallman St., Pittsburgh, Pa.

Taylor Made CHAIN SINCE 1873

Circle Item No. 83—Reader Service Card

Conforms to ASA Safety Code requirements for cupwheel guards

CARROLL'S SAFETY-GUARD INSERTS

Give you BUILT-IN Operator Safety and Top Performance.

This radically new Safety Guard Insert with its integrated revolving guard gives you the all-important safety factor with increased wheel strength and efficiency.

Added economies in production are gained from the ready-made molding form provided by the Guard. True dynamic balance, back flatness and concentricity, show consistently close tolerances within .010 T.I.R.

Safe grinding wheels mean increased production — use and specify wheels with the new Carroll Safety Guard.

• A Positive Guard on Every Cup Wheel • Highest Safety Factor • One Piece Assembly • Increased Strength • Light Weight • Fool Proof Mounting • No Adjustment Necessary • True Dynamic Balance

PM INC. *Write for Information on Carroll's Safety Guard Insert*

CARROLL
PRESSED METAL, INC.
133 DEWEY ST.
WORCESTER 10, MASS.

Circle Item No. 84—Reader Service Card

neer, Liberty Mutual Insurance Co. (Food & Beverage)

Burning Plastics—Toxic Gases

Firemen immediately don respiratory protective equipment when faced with internal fire fighting situations. Even in a residence there may be a concentration of toxic gases from one or more plastic products.

Plastics are found everywhere from reception rooms to the interior of automobiles. Fire fighters should use self-contained breathing apparatus for protection against the toxic fumes of burning synthetic materials.

—*James R. Moher, deputy fire chief, Milwaukee Fire Dept. (Public Employee)*

Efficiency Talks

How to sell top management on safety? Show them accidents are inefficiencies, that an effective safety program is an efficiency measure.

1. Ghostwrite (for top management) letters or memos on safety that you think should be sent to key personnel.

2. Don't let top management become figureheads. Make them participate actively in the safety program.

3. Blow your own horn by publicizing your safety activities.

4. Above all, to sell a safety program to top management, be sincere and enthusiastic.

—*Joseph [illegible] Menendez, Falstaff Brewing [illegible]. (Accident Prevention [illegible])*

High-Voltage Age

Safety of workmen, customers, and the general public is a big responsibility in the high-voltage age. Safety is a common objective of any public utility firm.

The tremendous demands in recent years for electric power have forced the use of higher and higher voltages. The days when power could be economically supplied on a nonhazardous voltage basis are long since gone.

—*E. W. Glancy, engineer, Ameri-*

Institutions — Schools — Hospitals — Industrial Plants — Hotels — Caterers — Camps — Air Lines — Government — Civil Defense — Commercial Feeding Operations.

THE "AERVOID" CENTRAL KITCHEN SYSTEM HAS PROVED ITS WORTH IN ALL FIELDS OF MASS-FEEDING

AerVoiDs provide . . . Sanitary Vacuum Insulation - A positive Health Safeguard!

To-day's "Modern" trend toward centralization of food preparation is a milestone toward Economy, Better Quality and Higher Sanitary Standards.

Into this new picture nothing fits like AerVoiD's Portable, Stainless-Steel, High-Vacuum Insulated, food, soup and liquid Carrier-Dispensers. AerVoiDs alone provide the proven quality and durability to survive under rough usage, spreading their cost over a long period of uninterrupted service.

All AerVoiD Equipment, as indicated in our specifications is "In Compliance" with the sanitary construction requirements of the U. S. Public Health Service Ordinances and Codes.

Write for FREE Literature Kit NS-01
Our Consulting Service is also FREE

VACUUM CAN COMPANY
19 South Hoyne Avenue, Chicago 12, Illinois

AERVOID *Vacuum Insulated* Hot or Cold Food, Soup, Milk, Coffee and Beverage Carrier-Dispensers

Circle Item No. 85—Reader Service Card

can Telephone & Telegraph Co. (Public Utilities)

Chemistry plus Faith

What can you do until the fire department arrives? Get busy with a fire extinguisher!

The fire extinguisher is right down at the grass roots level of fire protection—right where the fires start. So what can you do until the fire department arrives? The answer lies in the old axiom: "The Lord helps those who help themselves."

—Dale K. Auck, director of the fire protection division, Federation of Mutual Fire Insurance Companies. (Fire Protection)

Overworked Phrase

The term "accident prone" may be overused. It is quite easy to coin a catch phrase to describe a situation. It is more difficult to prevent the phrase from being used too widely. The term "accident prone" is a good example.

Physiological conditions (lack of sleep, annoying situations, money problems) may make people vulnerable to an accident. Since such conditions can occur to all of us, it is improper to use such a term as "accident proneness."

—Dr. John H. Foulger, director of medical research, E. I. duPont de Nemours & Co. (Fertilizer)

Dogs and People

Torn pants, a nipped heel, uncertain and jittery moments—that's the meter man's lot, unless he understands dogs.

Dogs are like people. Some are friendly, some are nervous, some are timid and some are vicious. If properly approached, most of them will make friends. If you really like dogs, most of them will like you.

You should never show fright when near a dog. And never run from one. A dog can run a lot faster than you can.

—Joseph Tomars, safety director, Division of Public Utilities, Duluth, Minn. (Public Utilities)

Next time they'll have

FERROX®

underfoot

Make sure of non-slip footing at lowest cost with quick drying, abrasive filled Ferrox. Simply trowel on. One gallon covers approximately 35 to 40 square feet.

Write for Ferrox bulletin.

AMERICAN ABRASIVE METALS COMPANY

464 Coit Street, Irvington 11, N. J.

Circle Item No. 86—Reader Service Card

The Safest LIFE JACKET made

GENTEX WITH PATENTED

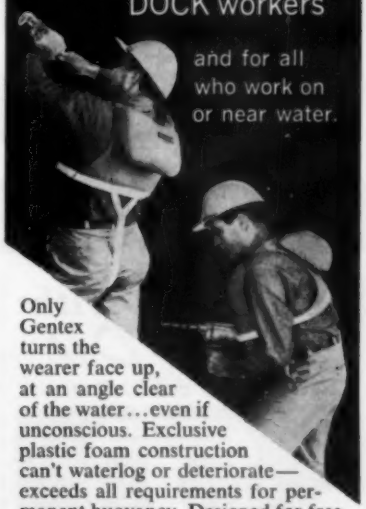
Face-up ACTION

PERFECT FOR:

SHIP • BRIDGE

DOCK workers

and for all who work on or near water.



Only Gentex turns the wearer face up, at an angle clear of the water...even if unconscious. Exclusive plastic foam construction can't waterlog or deteriorate—exceeds all requirements for permanent buoyancy. Designed for free and easy arm movement, holds securely in place with adjustable straps. Withstands hard use, needs no special care, can be washed or dry-cleaned.

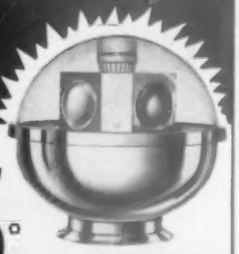
GENTEX GENERAL TEXTILE MILLS, INC.
450 Seventh Ave. Dept. TI
New York 1, N. Y.
EXPORT DIVISION: GENTEX INTERNATIONAL, INC.
450 Seventh Ave. N. Y. 1, N. Y.

Circle Item No. 87—Reader Service Card

Circle Item No. 88—Reader Service Card

40 BRILLIANT RED Flashes a minute

Prevents Accidents



Amazing NEW 360° REVOLVING LIGHT SENSATION

NEW TRIPPE MULTICOLOR HI-BALL MARK III

Designed for:

- Dangerous Entrances and Exits
- Hazardous Locations • Traveling Cranes
- Moving Machinery • Disaster Warnings

No one can miss this signal! Covers 360° like an airfield beacon . . . 40 Powerful red flashes a minute! Heavily constructed. Beautifully finished in chrome to S.A.E. requirements. TROUBLE FREE synchronous motor 115/130 V., A.C. Standard 75 W. Bulb easily replaceable. Maintenance and upkeep negligible.

WRITE TODAY! Get the Facts

TRIPPE MFG. CO., Dept. E-2
133 N. Jefferson St., Chicago 6, Ill.

SAVINGS ★

SAVE 100% ON TOWEL COSTS ...85% ON MAINTENANCE

★ SERVICE

24 HR. SERVICE! NO CABINETS TO FILL! NO TRASH TO EMPTY!

SANITATION

NEATER WASHROOMS—NO LITTER, MESS, OR CLOGGED PLUMBING

Get ALL 3 with Sani-Dri

Electric HAND and HAIR Dryers

WRITE TODAY FOR NEW BROCHURE!

See why More People are changing to Sani-Dri for modern automatic drying service!

"Dependable Since 1897"

THE CHICAGO HARDWARE FOUNDRY CO.
10118 Commonwealth Ave. North Chicago, Ill.

Circle Item No. 89—Reader Service Card

Calendar Contest Winners For August

"....."

What would your Safety Saying have said?

Miss Ellen Bates, teacher and member of the Board of Education, Birmingham, Ala., won the $100 first prize in the National Safety Council's "Safety Saying" contest with this line:

Humpty Dumbty!

The contest appears monthly on the back pages of the Council's calendar. The theme for the August contest was "Be Alert to Danger."

Second prize of $50 went to George Fritsky of The Atlantic Refining Co., Philadelphia. His entry was:

A sturdier deck may save your neck!

Miss Jessie Belitsky, Goodyear Aircraft Corporation, Akron, Ohio, won third prize of $25 for this line:

The 'rung' approach would be 'right' here!

The 30 winners of $5 prizes are:

James E. Davis, Jr., Ellington AFB, Houston, Tex.

Caesar Wyssbrod, Jr., DuPont Neoprene Plant, Louisville, Ky.

Miss Frances V. Lawson, Bemis Bro. Bag Co., Boston, Mass.

Malcolm H. Baehr, The Texas Company, New York City.

Miss Anna Monkiewicz, (Individual Member), Astoria, Ore.

Mrs. Ray Diekman, (Individual Member), Normandy, Mo.

Mrs. Ben B. Dibrell, Oklahoma Gas & Electric Co., Ardmore, Okla.

Arthur A. Dosch, Consolidated Edison Co. of New York, New York.

Mrs. D. W. Hendrickson, State Compensation Insurance Fund, San Bernardino, Calif.

Circle Item No. 90—Reader Service Card

AT LAST! RELIEF from ATHLETE'S FOOT IN SHOWER ROOMS or you pay nothing

Outmodes poisonous foot baths that make feet sore

A MORALE BUILDER costs less than 50¢ a man year

BATHERS PREFER IT! TRY IT—NO OBLIGATION TO BUY IT!

NEW refreshing non-poisonous FUNGICIDE write FOAM-X COMPANY Santa Barbara, Calif.

EASTERN SHIPPING DEPOT HUNTINGTON, IND.

Lather • Fragrance • Safety

Premium antiseptic liquid soap

Balmaseptic

For washroom and shower
Contains Hexachlorophene

Clear, brilliant Balmaseptic rubs up quickly into handfuls of fragrant lather. Cleanses energetically, yet does not irritate the skin—does not chap. Regular use keeps the hands surgically clean: *the HEXachlorophene puts the HEX on bacteria.* Balmaseptic dispenses neatly—stores perfectly: does not turn cloudy or rancid, regardless of climate. Exceeds forthcoming U.S.P. Specifications for Hexachlorophene liquid soap

For free sanitary survey of your premises consult your Dolge service man.

Dependable DOLGE WESTPORT, CONNECTICUT

Circle Item No. 91—Reader Service Card

Circle Item No. 92—Reader Service Card

THE POSITIVE
LADDER SAFETY DEVICE

CLIMBING MADE SAFE!
If climber starts to fall, device locks in a notch automatically, instantly. Holds securely. Limits fall to 7 inches.

PREVENTS DEATH AND INJURIES
— FROM FALLING

AUTOMATIC, POSITIVE. Will instantly catch and hold workman if he starts to fall, **even if unconscious.** Requires no attention from climber; he climbs in normal manner. Inexpensive. Easy to install; 3 men can clamp it to ordinary ladder in few hours. Clamps to any rung ladder, peg ladder, pole or framework. No welding or cutting. Notched rail hot-dipped galvanized. Entire equipment rust and corrosion proof. Can be kept free of ice by applying heat inside the carrier rail. In use approx. 10 years. Approved by Safety Engineers and Govt. Agencies throughout country. Patented. Manufactured only by

SAFETY TOWER LADDER CO.
1024 Burbank Blvd., P.O. Box 1032
BURBANK, CALIFORNIA

WHO IS RESPONSIBLE?

YOUR RICHEST GIFT, Owens-Illinois' dramatic industrial eye safety motion picture, points up the employee's share of responsibility for proper use of eye safety equipment.

Prints of the *new* YOUR RICHEST GIFT, just refilmed from the original popular script, are available at *production cost.*

For information about this 16mm, sound, color, 10-minute film, write:
H. V. Gardner, Director of Safety
Owens-Illinois Glass Company
Toledo 1, Ohio

Circle Item No. 93—Reader Service Card

Raymond D. Kohler, Doehler-Jarvis Div., National Lead Co., Pottstown, Pa.

Clarence E. Davis, Arizona Public Service Co., Tucson, Ariz.

Miss Virginia Buckley, Haverhill Gas Co., Haverhill, Mass.

Wesley E. Corley, Liberty Powder Defense Corp., Childersburg, Ala.

Mrs. Nelle Thompson, (Individual Member), Lakeland, Fla.

Miss Elizabeth L. Goerss, (Individual Member), Cleveland.

Mrs. E. B. Lively, (Individual Member), Huntington, W. Va.

Mrs. Ruth Zaimor, Pratt & Whitney Aircraft Div., United Aircraft Co., East Hartford, Conn.

Frederick A. Seitz, Pittsburgh Plate Glass Co., Works No. 1, Creighton, Pa.

Earle F. Baker, Continental Steel Corp., Kokomo, Ind.

Mrs. Velma Schelles, (Individual Member), Battle Creek, Mich.

Maj. Gaylord H. Gilmore, National Guard Armory, Tulsa, Okla.

Miss Hazel McCartney, (Individual Member), Clark's Mills, Pa.

Mrs. Marcel M. Thomas, (Individual Member), Fairborn, Ohio.

Miss Mary H. Hamill, Socony Mobil Oil Co., Albany, N. Y.

Miss Inez Sheerin, (Individual Member), Burlington, Mass.

George Jeffares, Jr., Plantation Pipe Line Co., Atlanta, Ga.

James Baggett, Alpha Portland Cement Co., Birmingham, Ala.

Miss Jane M. Hopkins, Bell Telephone Co. of Pennsylvania, Philadelphia.

E. Combs, The Procter & Gamble Co., Cincinnati, Ohio.

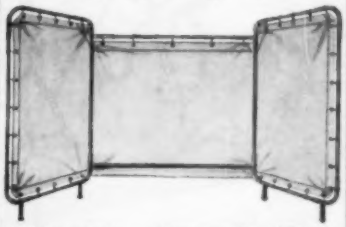
George G. Pitkin, The Mountain Copper Co. Ltd., Martinez, Calif.

"Used to take dancing lessons. Saved my toes more than once."

Circle Item No. 94—Reader Service Card

PORTABLE SINGER SCREEN

The only screen of its kind!



★Light weight ★Rust-proof ★Sturdy
★Assembles in 5 minutes—no threads
★Folds flat ★Can be used as wall curtain

AT LAST—a portable screen that is a fraction of the weight of the old type. Withstands rough handling. Available in every wanted size. Ask your dealer or write us

Special Products Division

NEW 16 PAGE CATALOG
Complete Line of Work Gloves, Welding Gloves and Safety Clothing

SINGER®
GLOVE MFG. CO.
860 W. Weed St.,
Chicago 22

MARKS OF QUALITY in SAFETY EQUIPMENT

AIRCO • OHIO • JACKSON

Safety goggles, spectacles and lenses. Helmets and face shields. Protective clothing. Safety (hard) hats. Portable oxygen resuscitator units. Bellows (air) portable resuscitators.

Write for full-color brochure.

AIR REDUCTION SALES COMPANY
A division of Air Reduction Company, Incorporated
150 E. 42nd St., New York 17, N. Y.
OFFICES IN MOST PRINCIPAL CITIES

Circle Item No. 95—Reader Service Card

Let's not clean away dollars and man-hours with costly, inadequate floor care

MECHANIZE *your floor-cleaning with a* COMBINATION SCRUBBER-VAC!

(Powder Dispenser and Level Cable Wind are accessories)

Wherever *combination-machine-scrubbing* is the practical solution to the floor-cleaning problem, any lesser, slower method is wasteful of money and manpower. A *Combination Scrubber-Vac* applies the cleanser, scrubs, flushes if required, and picks up (damp-dries the floor)—*all in one operation!* Maintenance men like the convenience of working with this single unit . . . the thoroughness with which it cleans . . . and the features that make the machine simple to operate. It's *self-propelled,* and has a *positive* clutch. There are no switches to set for *fast* or *slow* — slight pressure of the hand on clutch lever adjusts speed to desired rate. The powerful vac performs quietly. Cable reel is self-winding. *Finnell's 213P Scrubber-Vac* at left, an *electric* unit for heavy duty scrubbing of large-area floors, has a 26-inch brush spread. Cleans up to 8,750 sq. ft. per hour (and more in some cases), depending upon condition of the floors, congestion, et cetera. (The machine can be leased or purchased.)

Finnell makes *Scrubber-Vac Machines* in a full range of sizes, and *gasoline* or *propane powered* as well as *electric* models. From this complete line, you can choose the size and model that's exactly right for *your* job (no need to *over-buy* or *under-buy*). It's also good to know that *a Finnell Floor Specialist and Engineer is nearby* to help train your maintenance operators in the proper use of the machine . . . to recommend cleaning schedules for most effectual care . . . and to make periodic check-ups. For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2211 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

FINNELL SYSTEM, INC.

Originators of Power Scrubbing and Polishing Machines

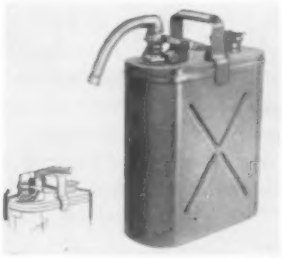
Everything FINNELL for Floor Care

BRANCHES IN ALL PRINCIPAL CITIES

Circle Item No. 96—Reader Service Card

New SAFETY EQUIPMENT

Product announcements in this section are reviewed for compliance with the advertising policy of the NATIONAL SAFETY NEWS. Inclusion should not, however, be construed as endorsement or approval by the National Safety Council.



Safety Can

An oval shape makes a more compact container, requires less storage space, and is easier to handle and use. Five oval-shaped cans can be stored in storage cabinets and safety vaults in the same area required for three conventionally round safety cans.

A flexible metal pouring spout eliminates hazardous spillage when dispensing, and permits filling containers with small receiving openings without waste. The pouring spout swivels to a "tuck-away" position over the can body when not in use.

Seams are lap-joined and electrically seam-welded into a single leak-proof container; terne plate construction provides for inside and out lead-coating for greater resistance to corrosion. Sides of the safety can are debossed for added strength, and a shock rim at the bottom raises the body from the floor.

The fill opening cap opens to a full 80 degrees, and the fill opening and dispensing opening have perforated metal fire baffles to guard contents from ignition. The self-closing cap over the fill opening also supplies automatic vapor pressure relief.

Protectoseal Co., 1920 So. Western Ave., Chicago 8, Ill. (Item No. 301)

Ground Detector Alarm

The Brunt Ground Detector and Alarm warns of accidental grounds on power lines and is wired into power systems.

On the face of the instrument are three phase indicator lamps, a red warning lamp, a fuse holder and a reset button. When wired into the power system, the indicator lamps will glow with equal intensity until a ground occurs on the system.

At this point one of the three lamps will go out and the other two glow brighter, the dimmed lamp showing on which phase of the system the ground has occurred. Simultaneously, the red warning lamp begins flashing, giving another visual warning, and a relay actuates a horn or bell, which should be connected with the instrument to give an audible warning.

These warnings continue until the reset button is pushed. Then the red light changes from a flashing to a steady glow, remaining that way until the ground is cleared.

Installation is at the convenience of the maintenance department, although connections should be made at the main distribution panel. The instrument is for use on a.c. and d.c., 25 to 400 cycles, 1, 2 and 3 phase. Several power voltages are available.

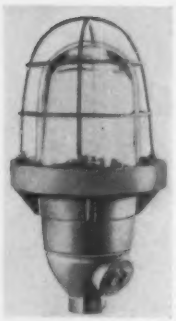
The Brundee Co., Cranford, N. J. (Item No. 302)

Safety Shoe

This steel box-toe shoe features vinyl aluminum top coated welting. The aluminum's heat resistant properties wards off sparks and protects the welt. This feature increases wearability and life. The welting was subjected to rigorous conditions of a pot room in a steel plant. The shoes, known as the H909 Nullifier, were worn by a moulder and withstood the heat of molten metal splashes.

Hy-Test Safety Shoes Div., International Shoe Co., 1509 Washington Ave., St. Louis, Mo. (Item No. 303)

For More Information—Circle Item Number on Reader Service Postcard



Explosion Proof Lighting Fixture

The E-Series line of Explosion Proof Lighting Fixtures, UL approved for atmospheres containing flammable gases or vapors, has met the requirements for Class I, Group C, and Group D atmospheres.

The fixtures are designed to operate at a temperature below the ignition of the gas-air or vapor-air atmospheres. The fixture construction resists internal explosion without damage, so no escaping gases will be allowed to ignite the flammable atmospheres in which they operate.

These E-Series fixtures are available in three basic types: the Pendant type "EP" series; the Junction type "EX" series; and the Bracket type "EB" series. The illustration shows type EP-123 fixture. All units take up to 200-w. lamp size, and reflectors are available in standard, shallow and angle domes.

The fixtures may be used in paint-spraying and finishing departments in industrial plants. Manufacturers of paints, plastics and pharmaceuticals, and hospitals and oil refineries will find these units valuable where safe illumination is required (despite the presence of flammable atmospheres).

Rab Electric Mfg. Co., 605 E. 132nd St., New York 54, N. Y. (Item No. 304)

Flashers—Barricades

A rugged, dependable 30-in. barricade, made of heavy gauge steel, has two coats of baked yellow enamel with black trim.

The legs retract into the barricade for storage. The lightweight (30#) unit is available with one or two 7-in. flashers. Extension swivel brackets are optional, and the barricades are equipped with Scotch Lite for better visibility.

The 7-in. flasher is powered by two 67½-volt batteries with a life of more than 3,000 hours. The 7-in. plastic lens is available in amber or red, and the flasher housing is made of heavy gauge steel. It is designed for use with a pad-lock, and may be used independently of the barricade. Light direction may be one or two-way.

Park Industries, Inc., 4328 Oakwood Blvd., Melvindale, Mich. (Item No. 305)

Insulated Blankets, Housings

"Pre-Klad" insulated blankets and housings, factory-sheathed in heat-resistant foils, fit unusual shapes and permit low-cost, assembly-line installation for service to 2000 degrees.

Pre-Klad is strong, light and custom-made from Cerafelt refractory-fiber felt encased in aluminum, stainless steel, titanium and other thin foils and meshes. The Cerafelt is sandwiched between inner and outer foil jackets, then spot or seam welded into an integral component blanket or housing.

Recommended applications include steel and diesel manufacturing applications, gasoline engines, gas turbines, high-temperature valves and fittings, steam turbines, removal casting and forging covers, gear housings.

Johns-Manville, 22 E. 40th St., New York 16, N. Y. (Item No. 306)

Emergency Oxygen

The "Oxy-Quik" is a completely equipped, hand portable unit featuring a pressure-reducing regulator to permit oxygen flow simply, easily and safely.

The unit requires no tools, wrenches or washers to operate or for tank replacement. The lightweight unit—2½ pounds—contains oxygen tanks, pressure reducing regulator, mask and hose in a plastic carrying case and can be hung on walls, snap or clasp on stretchers, wheel chairs, beds and other equipment.

Oxygen Equipment & Service Co., 8335 S. Halsted St., Chicago 20, Ill. (Item No. 307)

Sound Room

Acousti-room "250" is an audiometric enclosure for industrial and clinical hearing tests. Built of acoustic panels 2½ in. thick, the room features a patented "Noise-Lock" door with Noise-Lock corners and joints, window and ventilation silencer. A telephone-type jack panel includes four jacks for audiometer, earphones and signal light connection.

Optional equipment includes a continuous forced-air ventilator, 12-in. Formica-topped folding shelf, extra double-glazed windows, a 24-in. square desk and an intercom system. The room can be moved from one location to another by fork truck.

Maico Electronics, Inc., 21 N. Third St., Minneapolis, Minn. (Item No. 308)

For More Information—Circle Item Number on Reader Service Postcard

Safety Clamp

A new model of the Tulito Safety Clamp features a patented "belt to guide" device that gives the workman freedom while ascending, working and descending on poles. The clamp has gained acceptance among industrial commissioners and safety engineers.

Meyer Machine, Inc., Red Wing, Minn. (Item No. 309)

Exhaust Muffler

The "Silent Air" exhaust muffler is an efficient method of cutting noise from air devices to almost complete silence. It is designed for pneumatic air devices and is easy to install, since both male and female connections are standard on each unit.

The muffler has many applications in industry and wherever air devices are used. Material specifications include corrosive-resistant metals and replaceable muffler cartridges.

Emco Pneumatic Corp., 1317-1319 Locust St., Des Moines 9, Iowa (Item No. 310)

Safety Message Clock

A three-foot, neon-illuminated, multi-colored clock carries safety-reminder messages.

The message area, lighted by reflection, includes a 66-in. shield around the top half of the clock. Space is ample for letters 4 in. high, and any custom message desired up to 20 letters and spaces will be applied by the manufacturer.

Safety messages can be read for distances of up to 300 ft., so the units can be used effectively outdoors in parking lots, and in poorly-lighted corridors or buildings. Light output of the neon tube rings—one pink and the other white—is said to be 90 lumens and 120 lumens per foot for maximum brilliance without glare.

The clock is enclosed with a water-tight, optically-clear molded plexiglass face, and is furnished with an eight-foot appliance cord and standard bayonet-type mounting bracket.

Any additional message can be provided by the user directly below the clock for specific safety details, such as elapsed time without an accident, etc.

Electric Neon Clock Co., 13900 Broadway, Cleveland 25, Ohio (Item No. 311)

Survey Meter

The "Sentinel," a lightweight, portable, battery-operated survey meter, can be used for general-purpose survey work in radioisotope laboratories and wherever radioactive materials are encountered.

A choice of two interchangeable probes is offered: a beta-gamma discriminating probe, or an end-window probe for alpha, soft and hard beta, and gamma detection. Radioactivity is indicated by earphone, by a flashing red panel, and by a six-range meter reading in counts per minute (0-50,000) and mr/hr (0-25).

Other features include a variable high-voltage supply, patented calibration check, shock-proof and weatherproof design, and split-case construction, so no tools are needed when replacing batteries or tubes.

Nucleonic Corp. of America, 196 Degraw St., Brooklyn 31, N. Y. (Item No. 312)

Respirator

The Thermalair Respirator provides protection against excessive heat. It protects workers in areas where intense heat endangers health, such as in kilns and ovens having temperature ranges from 150 to 300 degrees. The device can also be used for emergency entrances in furnaces and boilers for repair work.

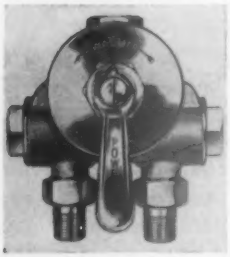
Field tests show the Thermalair to be a practical safety device, particularly on operations where workers are limited to a few minutes of activity because of hot conditions.

The unit can be used with heat-reflective clothing in temperatures up to 300 degrees. An aluminized hood of heat-reflective clothing accommodates the respirator. Worn with this aluminized asbestos suit, the respirator gives the user more freedom of movement by substituting for self-contained breathing apparatus or airline hose and mask.

The Thermalair is a device capable of exchanging overheated air for respirable air. The respirator cartridge contains a metal screen heat exchanger, which absorbs heat when the user inhales. Absorption is great enough to cool incoming air to about body temperature. As the user exhales, stored hot air is forced out and the cycle repeats.

The unit weighs only six ounces and has a low breathing resistance.

American Optical Co., Safety Prod. Div., Southbridge, Mass. (Item No. 313)



Steam-Water Mixer

Increased safety for workers involved in wash-down operations using steam and water can be obtained with this Style D mixer. It is designed for organizations that wash resin and debris off plant floors with a hose in which cold water and live steam are mixed. The mixer automatically maintains the wash-down water at a given temperature regardless of flow changes in the water or steam supply lines, protecting the worker from scalding.

Water temperatures up to 200 F can be delivered by the mixer at rates of up to 14 gallons per minute, depending on the water temperature desired.

A floating piston in the mixer controls and equalizes the flow of steam and water before they enter the mixing chamber. It compensates for variations in the supply lines due to the use of nearby faucets or valves.

Check valves are built into the mixer inlets to prevent the interchange of steam and cold water when the mixer is not in use.

Powers Regulator Co., 3434 Oakton St., Skokie, Ill. (Item No. 314)

Overhead Maintenance Equipment

Model 40, Lift-A-Loft, offers a safety and stability while reaching 15 ft. over obstructions and extended to a platform height of 40 ft. The mobile, self-propelled model requires one man for operation, and is provided with built-in facilities to expedite maintenance and increase safety.

The unit has a safety railing and kickboard and a large 21-sq.-ft. working area, with a floor plate to prevent slipping. The double lift chains offer a safety factor of 3 to 1 on each chain, and the 500-lb. platform capacity has a low center of gravity with the resulting safety factor in excess of 5 to 1.

The all-steel machine is reinforced to assure stability, and the mechanisms are protected by limit switches. Model 40 is painted a bright orange, with black stripes. Warning devices function while the unit is in travel. The machine can be turned 90 degrees and features a 20-in. dual drive unit.

Lift-A-Loft Co., P. O. Box 1225, Muncie, Ind. (Item No. 315)

Safety Shoe Soling

"Para-Vinyl" is a stitchable safety shoe soling material proved resistant to heat, oil, acids and caustics.

The material has been tested in automotive and chemical plants, and has been put into prolonged use by policemen and firemen. According to the manufacturer, tests have shown Para-Vinyl justifies its claim to the highest abrasion factor available. Tests conducted under unusually abusive underfoot conditions show the product has positive slip resistance and excellent low-temperature flex. Para-Vinyl is made from Paracril O. Z. O.

Gro-Cord Rubber Co., 807 N. Jackson St., Lima, Ohio (Item No. 316)

Polisher-Scrubber

Model PRO-13 floor and rug scrubber is for small- and medium-sized hotels and buildings. The unit combines important construction features and scrubbing performance in a low-cost 13-in. machine. PRO-13 features a powerful ⅓-hp. motor, helical cut gears, adjustable handle, momentary contact safety switch. The same unit can be used for polishing, scrubbing and steel wooling many types of floors.

Hild Floor Machine Co., Inc., 1217 W. Washington Blvd., Chicago 7, Ill. (Item No. 317)

Safety Strap

A filament nylon safety strap gives the features of nylon, plus longer wear, firmness, flexibility, and attractive appearance.

Straps are made from continuous filaments, running as unbroken threads for the length of the strap and woven into a fabric whose multiple plies are bonded together with frictioned, vulcanized neoprene compound.

The straps feature higher strength, durability against internal and external abrasion, and rot, decay and fungus. Dielectric qualities, ease in handling, and resiliency, are other features. The outer covering and impregnation of green colored neoprene provides a protective covering for the nylon fibers against pole treating compounds. The center section is red to indicate when "pole wear" calls for strap replacement.

R. H. Buhrke Co., 1403 W. Congress St., Chicago 7, Ill. (Item No. 318)

Anti-Skid Surface

An all-direction, anti-skid treading surface, called "Firm-Grip," is made of solid steel bars in a lightweight assembly. The all-directional serrated surface gives non-skid, comfortable treading surface.

It is designed for installations requiring men and women employees to stand on one location to perform their work. Firm-Grip has been tested for its effectiveness in plants having a majority of women workers, and where safe, comfortable footing is important.

Bustin Steel Products Inc., Dover, N. J. (Item No. 319)

Safety Cleaner

A heavy-duty safety cleaner and degreaser, furnished in high concentration to be diluted with water, can clean industrial plants from conveyors to washrooms.

Depending on the amount of water used for dilution, the spray can be used for heavy-duty degreasing of machinery, motors, diesel equipment (in the plant), and fixtures, tile, glass (in washrooms). It is safe to use on aluminum and other soft metals.

Non-flammable, non-toxic and harmless to hands, the cleaner contains inhibitors to prevent rust and corrosion of metal surfaces.

Harco Chemical Co., Cranford, N. J. (Item No. 320)

Fingerguard

A fingerguard designed for industrial cutters using a round knife machine will reduce the possibility of injuries. The "Fingerguard" fits either hand, allows freedom of movement, and is adjustable to fingers of any size. The aluminum guard can be adjusted to cover the finger.

Julius Bril, 132 W. 22nd St., New York 11, N. Y. (Item No. 321)

Spray Cleaner

Vythene-E spray cleaner is a purified grade of Vythene with a low percentage of non-volatile material and a boiling range narrower than that of commercial 1, 1, 1-Trichloroethane. Because of the low percentage of residue in the product, Vythene-E is finding acceptance in uses, such as the cleaning of oxygen-bearing equipment, sensitive electronic parts, and for extraction and pharmaceutical purposes.

Produce is about 20 times less toxic than carbon tetrachloride and has no flash point. The product is stabilized to metals, including aluminum, and can be reclaimed by distillation.

Tect, Inc., Northvale, N. J. (Item No. 322)

Safety Goggles

Eight new models of cup-type safety goggles are designed for heavy industrial operations.

The goggles are injection molded from tough thermo-plastic, have high-impact resistance, and their contour design guarantees safety and fitting comfort. All styles have a luster finish, which gives ease to cleaning and sterilization.

Highlighting two models of the line is a removable soft sponge face pad. The pad snaps at the top and bottom for cleaning or replacement—a feature helpful in assuring sanitation when goggles are worn by more than one person.

Four chipper-type goggles have heat-treated lenses and perforated side shields for ventilation. An adjustable head band is standard equipment.

Cup-type goggles for welders feature Arc-Ban, a dark green glass which provides protection from harmful infrared and ultraviolet rays. Arc-Ban is available in 10 different shades to allow proper radiation protection for every type of welding. Newly-designed side shields guard the eyes against sparks and side flashes.

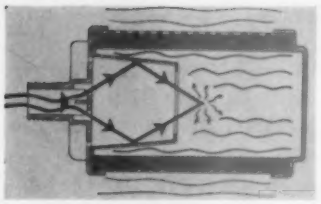
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y. (Item No. 323)

Anti-Slip Absorbent

A safe, anti-slip absorbent for oil, grease and water deposits is called "Soakup." The manufacturer claims it can absorb 425 per cent of its weight in oil. It also has the ability to completely dissolve all residual oil films when water is added to it. The material is an aluminum silica in calcined form.

It soaks up oil, water, grease or acids and can be swept up immediately after applying to the material. The product is dustless, non-flammable and will not deteriorate in storage. It carries a UL seal.

The Bares Co., Cleveland 20, Ohio (Item No. 324)



Air Noise Silencer

The Atomuffler (pneumatic muffler) features an improved, internal resonator that efficiently silences irritating noise resulting from air-operations. The Atomuffler has been engineered to utilize the scientific principle of canceling equal and opposite forces.

As speeding air leaves the air-operated machine's exhaust port, the internal deflector breaks up the air jet. The resulting, scattered waves are parabolically reflected into many, opposing, high-velocity forces. Collision of these focused forces cancels the rushing air *before* it can become ear-splitting noise.

The radial disseminator then permits the lowered-velocity exhaust air to quietly drift into the atmosphere. This cancellation principle enables the small, compact Atomuffler to diffuse escaping air at a ratio of 60 to 1.

Allied Witan Co., Inc., 12500 Bellaire Road, Cleveland 35, Ohio (Item No. 325)

Industrial Knives

New safety principles have been incorporated into two industrial cutting knives. The knives may be used to speed industrial cutting, trimming and slicing operations, particularly in electronics, aircraft, electrical, missile and radio and television manufacturing.

Each knife is made of heavy-duty, machined aluminum and has a knurled, easy-to-grip sliding sleeve, which may be locked at any position on the knife barrel. The sleeve can be moved back to reveal the knife blade completely, or locked to expose any segment of the blade.

The knife's sleeve may be extended to cover the blade for carrying. Blades are available in a variety of shapes and sizes. The new industrial knives are produced in two sizes. The slim handle (5 in.) 1-G knife, weighs less than one-ounce. The beaver handle (6¾ in.) 2-G knife takes larger blades.

X-Acto, Inc., 38-41 Van Dam St., Long Island City 1, N. Y. (Item No. 326)

First Aid Kits

Heavy-duty first aid kits facilitate emergency treatment through unit-wrapped items, boldly labeled and arranged for immediate recognition and access.

Each G-S Unit-Type Kit has a facsimile index on the inside of the case lid, which shows the location of all items and gives concise instructions for their use. The index also serves as a positive inventory control, since any missing items can be quickly identified from the facsimile table.

Cases are made of 20-ga. steel, finished in olive green or grey baked-on enamel. The lids are hinged along the entire length of one side and are fitted with a rubber gasket to keep out dust and dampness. Integral mounting brackets and carrying handle permit the kits to be used for permanent wall installation or portable service.

The kits are available in sizes of 10, 16, 24 and 36 units, with standardized assortments of first aid items or with *custom* assortments to meet special requirements.

General Scientific Equip. Co., P. O. Box 3038, Philadelphia 50, Pa. (Item No. 327)

Face Shield

The "Trojan" Face Shield is designed to fit everyone. The polyethylene headgear has a ratchet adjustment and can be adjusted to the desired head size by pressing and turning a small knob at the rear. The headgear automatically locks to size when the knob is released. The top band adjusts to the head shape with a pin lock.

The clear or green acetate windows in 4, 6 or 8-in. lengths, and in .020 and .040 thickness, are easily and securely installed on wide fiber spark guards with three positive snap fasteners.

Welsh Mfg. Co., 11 Magnolia St., Providence, R. I. (Item No. 328)

For More Information—Circle Item Number on Reader Service Postcard

Spark Arrestor

This spark arrestor is claimed by the manufacturer to be almost 100 per cent efficient at all times for application on small internal-combustion engines up to 40 hp. or 150 cu.-in. engine displacement.

It mounts vertically at the end of the exhaust pipe and finds its application on stationary and portable engines, small power plants, hay loaders, hay bailers, pumps and other equipment operating in areas where incandescent exhaust carbon is a fire hazard.

The exhaust carbon is trapped in the arrestor for periodic disposal. The Arrestor is made of stainless steel for long life, and is 3¼ in. by 3½ in. in size.

Erickson Products Co., 1960 Carroll Ave., San Francisco 24, Calif. (Item No. 329)

Hard Hat

A new type of protective head gear protects workers in confined areas with possible head hazards. The "Bump Cap" is made of unbreakable, resilient plastic for comfortable wear. It is also resistant to chemicals. A flat space on the front of the cap is suitable for placing company insignia. The cap comes with an adjustable head band and chin strap and weighs only 6½ oz. complete. It is especially useful in confined quarters or work in which there is no hazard from falling objects.

B. F. McDonald Co., 5721 W. 96th St., Los Angeles 45, Calif. (Item No. 330)

For More Information—Circle Item Number on Reader Service Postcard

NEWS ITEMS

Walter Kidde, Inc.

Vernon Haack will represent the company as a resale supervisor serving the organization's distributors in Michigan, Ohio, Kentucky, West Virginia, Western Pennsylvania and Western New York. Mr. Haack will operate out of the Detroit District Headquarters of the fire equipment manufacturers.

Robert Haack has joined the company in the Chicago District, and will be working in Illinois, Indiana, Iowa, Wisconsin and Minnesota. Both of the brothers have a number of years experience in fire extinguishing equipment.

John D. Mahoney

Granet Corp.

John D. Mahoney has been appointed the Philadelphia, Baltimore, New Jersey and New York representative for this Framingham, Mass., manufacturer of coated fabric work gloves. Mr. Mahoney will represent the company on a full-time basis.

Cecil W. Wilson

Exide Industrial Division Electric Storage Battery Co.

Cecil W. Wilson, Chicago branch sales manager, retired September 30 after nearly 43 years service with the Philadelphia firm. For the past 4½ years he has been in charge of the Exide Industrial Battery Sales and Service in the Chicago area. Mr. Wilson joined the company in 1915 and has long been in the Kansas City office.

Edward A. Goetz

Gentex Corp.

Edward A. Goetz has been appointed a sales manager for this New York City manufacturer of safety, mechanical and industrial products.

Mr. Goetz, formerly associated with Henrite Products Corporation and the St. Clair Rubber Company, will concentrate on expansion and development of the industrial lines of the company.

Circle Item No. 97—Reader Service Card

SOLDER WITH SAFETY AND SPEED

USE WILDER

ADJUSTABLE SOLDERING IRON HOLDERS

Three sizes for large and small irons. Can be placed on top of bench, fastened under bench or clamped to bench top or shelf. Available with wiping, pad attachment, also slide for fastening small holder to large.

Write for further information.

WILDER MFG. CO., INC.

DEP'T G

MECHANIC ST. & ERIE R.R. PORT JERVIS, N.Y.

Consultation Corner

—From page 52

There is so much good safety material on sound slidefilms that it would seem worthwhile to purchase a sound slidefilm projector especially for using these films. They are not expensive and are relatively small and easy to handle.

An important additional advantage is that on all the sound slidefilm records we have made for several years, one side of the record is made with an audible signal for advancing the film, and the other side of the record is made with an inaudible signal which advances the film automatically without attention from the operator. This, of course, requires a projector that is made for both manual and automatic operation. If you buy a projector it would be well to make sure it has this feature. The advantage of a film that operates without bells or beeps is obvious.

ASME, Rocket Society To Meet Separately

Announcing a major change in policy, The American Society of Mechanical Engineers and the American Rocket Society have announced that their future major national meetings will be held independently of each other. Both 1958 annual meetings will be held in New York but on different days.

Decision to hold separate meetings was dictated primarily by the expanding size of the technical sessions and limited hotel space available. A second reason assigned was the increasingly independent status of the field of rocketry and the concurrent growth of ARS in the technical field.

The 1958 ASME Annual Meeting will be held at the Hotels Statler-Hilton and Sheraton McAlpin, New York, November 30 through December 5; the 1958 ARS Annual Meeting will be quartered at the Statler-Hilton two weeks earlier, November 17-21.

Guide Pin Covers

PROTECT OPERATOR AND GUIDE PINS

Effectively guard against injury to operator, die and press on operations where bushings leave the guide pins. Protect pins and bushings from chips and dirt when entire pin and bushing are covered. Inexpensive, easy to attach.

Felt Oiler Ring in top units provides POSITIVE lubrication.

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SENTINEL

THE SENTINEL

Newest fully automatic stand-by lighting unit for emergency use when power fails.

Model No. 622

★ Tested and approved by Underwriters Lab.

★ Provides 8 to 10 hours of steady illumination.

INSTANTLY and AUTOMATICALLY

turns on, when power failures occur.

★ Automatically re-charges batteries and maintains proper charge level.

Weight 31 lbs. with batteries—Five year guarantee—6½" Dia. Heads.

The Portable Light Co., Inc.

216 WILLIAM ST., NEW YORK 38, N. Y.

Write for FREE Literature—Dept. 70

NO SAFER PROTECTION FOR PUNCH PRESS FEEDING

OSBORN Safety Pliers can't shatter if accidently caught in closing press dies . . . can't send a blinding splinter into an operator's eyes . . . can't damage your press dies!

They're made of Osmolloy, the amazing lightweight Aluminum alloy that flattens under impact—instead of shattering. Suggestions for virtually any individual application are yours for the asking . . . ask for Bulletin No. 1056 for the standard designs. THE OSBORN MANUFACTURING CO., Argonne Road, Warsaw, Indiana.

OSBORN SAFETY PLIERS

Circle Item No. 100—Reader Service Card

TRADE PUBLICATIONS

These trade publications will keep you up-to-the-minute on new developments in safety equipment and health products. All catalogs are free, and will be sent without obligation. Just circle publication number on the Reader Service Postcard.

Steel Trestles and Scaffolding

A new, revised catalog on steel trestles and scaffolding accessories for use by painters, plasterers and other light construction and maintenance workers has been released by The Patent Scaffolding Co., Inc., 38-21—12th Street, Long Island City 1, N. Y. Catalog M-R contains seven pages of profusely illustrated product photos, drawings and application views. Also included are specifications and where to use them for more efficient and safer working conditions.

For more details circle No. 400 on enclosed return postal card.

Safety Equipment Catalog

U. S. Safety Service Co. has available a new catalog that is very comprehensive showing, in addition to their various items of safety equipment, their research, production and prescription laboratory facilities. Each item displayed carries a complete description of the item in addition to features and suggested or recommended uses. Metal Frame S-7 shape spectacles which are available with the exclusive integrally molded screen side-shield; choice of 2 Two-Tone Frames in Jet Black or Rich Brown, which is available with the exclusive and original "Flat-Fold" sideshield that are attached permanently to temples and permit flat folding of spectacles when not in use; "PEP-UP" Impregnated Salt Tablets with Vitamins B_1, B_2, and C added. U. S. Safety Service Co., 1535 Walnut St., Kansas City 8, Mo.

For more details circle No. 401 on enclosed return postal card.

24-Volt Lift Truck

A new Circular 35-K describing the first narrow-aisle rider-type electric tiering truck with a 24-volt electrical system is available from Lewis-Shepard Products, Inc., Dept. R8-22, 125 Walnut St., Watertown 2, Mass. Available in capacities of either 2,000 or 3,000 lbs., the 24-volt Model "MN" maneuvers and high stacks goods in aisles as little as 6-feet wide when carrying a 40-inch long load.

For more details circle No. 402 on enclosed return postal card.

Selected Motion Pictures

Association Films' 1958-59 catalog of "Selected Motion Pictures" has just been published and is available free of charge to interested educational and community organizations. The 40-page catalog describes the several hundred free and rental 16mm sound motion pictures offered by the company for classroom, club and organizational showings. Among the new films announced are: 16mm sound motion pictures from the National Safety Council for employee safety programs; Industrial Arts Classes; Driver Safety Courses; Assembly Group Meetings; First-Aid Classes; Community Safety Groups. Association Films, Inc., Broad at Elm, Ridgefield, N. J.

For more details circle No. 403 on enclosed return postal card.

Safetee Solvents

Fine Organics, Inc., makers of Safetee Solvents, has just revised specification sheets on its complete line and bound them in Catalog form for convenient filing. Many new, unusual applications are outlined, in addition to complete specifications for each product. Fine Organics, Inc., 211 East 19th St., New York 3, N. Y.

For more details circle No. 404 on enclosed return postal card.

Chemical-Resistant Finish

A new technical bulletin, titled, "The Chemical Resistance of Astonized Finish on Synthetic Fabrics," has been released by the Onyx Oil and Chemical Co., Jersey City 2, N. J. The bulletin describes various tests made in the Onyx Laboratories using the company's Astonized finish on samples of Nylon, Dacron, Orlon and Dynel. Complete technical data concerning the test results are included. Expected applications for the Astonized Chemical-Resistant Finish are on laboratory coats, uniforms, work suits and other apparel used in occupations where chemicals and flammable solvents present a hazard. The anti-static properties of this finish also enable man-made fabrics to provide greater wearing comfort according to the manufacturer.

For more details circle No. 405 on enclosed return postal card.

Inhalators

A new 6-page brochure, "Scott Demand Inhalators," describes the Type "A" and Type "B" Scott Oxygen Inhalators and accessories available for each. The many features of Scott Demand Inhalators—the simplicity of operation, the demand principle and the constant flow availability "at the touch of a button"—are all described in detail. The use of the Inhalator by fire departments, highway police, ambulance service, industrial plants, nurses and doctors are all illustrated. Scott Aviation Corp., 211 Erie St., Lancaster, N. Y.

For more details circle No. 406 on enclosed return postal card.

Proved Answers to Successful Automation

Bulletin PA-561, 24 pages contains detailed specifications, complete descriptive data, operational charts and a concise selector guide for Photoswitch Photoelectric Systems for industrial control applications. These include long range protection against intrusion, counting, sorting, inspecting, precision registration and high-temperature measurement. Also described are Photoswitch Miniature and Sub-Miniature Photoelectric Receivers and light sources for control application on special machinery wherever space is limited. Electronics Corp. of America, Photoswitch Div., One Memorial Drive, Cambridge, Mass.

For more details circle No. 407 on enclosed return postal card.

"What Every Executive Should Know About This Vital One Thousandth of An Inch"

This 32-page booklet will be of great assistance to executives in their efforts to improve safety through proper floor care. It also contains helpful information on various types of floors, along with recommendations on the proper treatment required for maintaining each type of floor. Among the types of floor surfaces covered are asphalt, rubber, vinyl, cork tile, wood, concrete, terrazzo and marble. Masury-Young Co., Dept. NS, 76 Roland St., Boston 29, Mass.

For more details circle No. 408 on enclosed return postal card.

Miniature Mercury Switch

Micro Switch, Freeport, Ill., a Division of Minneapolis-Honeywell Regulator Co., has just issued a new data sheet (Number 149) on the ultrasmall Catalog Listing AS 419A1 Mercury Switch. The data sheet gives standout features of the tiny switch, only 9/10 inch long and weighing 1.8 grams complete with leads. Long life, extreme compactness and sensitivity of the switch suggest many uses in supersensitive control devices which demand outstanding switch reliability.

For more details circle No. 409 on enclosed return postal card.

Grating and Treads

A new, two-color, 16-page catalog on open floor grating and stair treads is available from Reliance Steel Products Co., P. O. Box 510, McKeesport, Pa. The catalog features many product illustrations of rectangular grating with various wearing surfaces, Reglet abrasive embedded non-skid grating, U-type grating, radial grating and numerous styles of treads. Complete engineering details, from panel sizes, weights and safe loads, to surface treatments and fastening methods are included.

For more details circle No. 410 on enclosed return postal card.

Power Snow Throwers

New literature describing Jari Product's full line of Power Snow Throwers, including the new "Northland Sno-Thro." The Jari Snow Thrower line, described in the publication, includes the Champion, a heavy-duty, self-propelled machine for large institutional and industrial snow removal jobs; the Jari Junior, a lighter, self-propelled unit and the Northland Sno-Thro, a low-cost, push-type snow thrower that has a field-tested rotary snow thrower assembly that will handle 300 shovelsful of snow per minute. Jari Products, Inc., 2990 Pillsbury Ave., Minneapolis 8, Minn.

For more details circle No. 411
on enclosed return postal card.

Pyrojector

Folders describing the new "Pyrojector" are now available from the Swartwout Co., 18511 Euclid Ave., Cleveland 12, Ohio. This patented automatic heat, smoke and explosion relief unit is fully explained with photographs and engineering specification information. "Pyrojectors" open automatically when fire or explosion strikes, venting smoke, heat, explosive forces up through the roof instead of spreading them out across a building. Damage area is limited and emergency equipment can reach the source of the fire or explosion.

For more details circle No. 412
on enclosed return postal card.

Metal-Clad Switchgear

Bulletin GEA-5664E, 40 pages, provides detailed information on the operation, characteristics and application of General Electric's complete line of indoor and outdoor Metal-Clad Switchgear, rated 2.4 to 13.8 kilovolts with interrupting capacities of 75 to 1,000 MVA. Publication describes General Electric Metal-clad's margins of versatility, system protection, safety, compactness, maintenance and ordering ease. General Electric Co., Schenectady 5, N. Y.

For more details circle No. 413
on enclosed return postal card.

Ice Melting Material

Speco, Inc., 7308 Associate Ave., Cleveland 9, Ohio, announces a new application bulletin on its Ice Rem-CF, chloride free ice melting material. Reputed to be 99.99 per cent chemically active, Ice Rem-CF is said to thaw ice by depressing the freezing point of water. According to manufacturer, it is harmless to concrete and asphalt and is especially recommended for parking lots and airfield use. It will not damage aluminum.

For more details circle No. 414
on enclosed return postal card.

Thermometer

A new, profusely illustrated 8-page booklet describing its complete line of stainless steel thermometers has been issued by W. C. Dillon and Co., Inc., 14620 Keswick St., Van Nuys, Calif. The booklet lists complete specifications and prices on the more than 100 Dillon angle form. straight form and special-purpose thermometers available today. Each Dillon Thermometer is individually calibrated for utmost accuracy. The direct drive bi-metal coil on each model eliminates gears and linkage . . . has an ample safety factor to afford permanent overheat protection. Waterproof, pressureproof Dillon Thermometers are constructed of acid-resistant 304 stainless steel and are furnished with a choice of mounting nuts for easy installation anywhere. Dillon Thermometers are available in five easy-to-read dial sizes from 1" to 5" diameter, in any stem length from 2½" to 72", in 12 Fahrenheit or Centigrade ranges to suit any heat-measuring requirements.

For more details circle No. 415
on enclosed return postal card.

Rules for Prevention of Dermatitis

Twelve-page booklet cites hazards of epoxy dermatitis and lists 36 specific and practical rules for prevention. Recommendations are grouped under five headings: education of workers and supervisors; company housekeeping procedures; ventilation; personal cleanliness of workers; and use of protective creams and clothing. Recommendations are based on practical experience of leading epoxy fabricators, materials suppliers, public health agencies and insurers. Milburn Co., 3246 E. Woodbridge, Detroit 7, Mich.

For more details circle No. 416
on enclosed return postal card.

Highway Hazard Lighting

Comprehensive information on the uses and maintenance of portable and hazard warning lighting equipment is included in the 1958-59 illustrated product catalog announced by R. E. Dietz Co. The catalog shows the full line of kerosene lanterns and highway torches, and the recently developed Visi-Flash transistorized highway warning flashers. Special sections cover Dietz railroad lanterns and the decorative Comet electric lanterns. Detailed product specifications include dimensions, burning time, and candle power. Photo sequences and instructions, based on Dietz research and field surveys explain proper uses and maintenance of the various hazard warning lights. R. E. Dietz Co., Portable and Hazard Lighting Div., 225 Wilkinson St., Syracuse, N. Y.

For more details circle No. 417
on enclosed return postal card.

Sound Protectors

Brochure S-5244 describes company's complete line of Straightaway sound protectors, including the new No. 372 style. The new model features an extended sponge lip around the ear seal, which provides a better fit over eyeglass temples and a more cushioned fit against the head. Ear seals are the elongated type which cover conductive jawbone openings as well as the ears. Ear domes swivel to fit any head shape. Straightaway sound protectors protect against high and low frequency noises. They are particularly recommended for protection on operations such as jet engine testing, drop forging, sand blasting and on industrial operations where noise is a hazard. American Optical Co., Safety Products Div., Southbridge, Mass.

For more details circle No. 418
on enclosed return postal card.

Safety Signs

Form 3547 illustrates Stonehouse No Smoking Signs for Industrial Accident Prevention. Prices and specifications are included. Stonehouse Signs, Inc., Stonehouse Bldg., 9th and Larimer St., Denver 4, Ohio.

For more details circle No. 419
on enclosed return postal card.

Cerafelt Insulation

A 6-page folder now available from Johns-Manville describes for high temperature equipment makers and users how J-M Cerafelt Insulation provides heat control to 2,000 F with only a fraction of an inch of thickness. Cerafelt, a highly versatile refractory-fiber felt insulation, originally was developed to protect jet aircraft from searing engine heat. So outstanding was its performance in this application that it since has been adapted to industrial use. More recently, this rugged "heat tamer" for tough high temperature jobs became available in combination with heat-resistant foils and meshes as prefabricated housings and blankets (known as J-M Pre-Klad insulations). The folder emphasizes the revolutionary design economies made possible by Cerafelt and points up the advantages of the material such as light weight, low "k" factor and flexibility. Examples are given of successful applications and data is given on thermal conductivity as well as densities, sizes and thicknesses. A conductivity graph shows that Cerafelt has a "k" factor about 1/10 that of hard fire brick. Johns-Manville, 22 E. 40th St., New York 16, N. Y.

For more details circle No. 420
on enclosed return postal card.

Flooring

Mastipave, a flooring that prevents slipping and skidding, is reviewed in an illustrated folder entitled "Every Building Needs Pabco Mastipave," available from Fibreboard Paper Products Corp., Pabco Floor Covering Div., 475 Brannon St., San Francisco, Calif.

For more details circle No. 421
on enclosed return postal card.

Goggles

Eye safety for workers engaged in welding, grinding, chipping, and chemical handling operations is assurred when they're wearing Econolite (Model 56) goggles, according to manufacturer's literature. Features of the product: special plastic frames for durability, integral deflecting louvres for ample ventilation and protection from splash or flying particles, and replaceable 50MM lenses affording a wide range of vision. Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.

For more details circle No. 422
on enclosed return postal card.

Drum Storage and Dispensing Devices

This catalog describes the function of these various products which have been developed specifically for flammable operations. These devices have both Underwriters' and Associated Factory Mutual Insurance Companies' approval. Protectoseal Co., Inc., 1928 S. Western Ave., Chicago 8, Ill.

For more details circle No. 423
on enclosed return postal card.

Fire Protection

Class A proprietary protection is provided by the console Model M-160 fire detection system reviewed in a colorful, 4-page bulletin. The device assures immediate detection and transmission of both coded and non-coded fire and trouble signals. Notifier Corp., 239 S. 11th St., Lincoln, Nebr.

For more details circle No. 424
on enclosed return postal card.

Welding Curtains

Welding shields manufactured by Frommelt Industries are described in new literature. Welding curtains, protective covers, asbestos heat curtains, aluminum-coated Ray-Tex welding blankets, radiant heat curtains, fire and insulating blankets, and portable room partitions are also featured. Fabric samples are available. Frommelt Industries, P. O. Box 165, Dubuque, Ia.

For more details circle No. 425
on enclosed return postal card.

Work Gloves

Instructions governing the choice of the "right glove for the right job" are contained in a booklet prepared by Hood Rubber Co., Watertown, Mass. Included in the coverage is a complete rundown on the new Hood "Grip-All" work glove.

For more details circle No. 426
on enclosed return postal card.

Floor Maintenance

Explosion proof cleaning equipment manufactured by Hild Floor Machine Co., Inc., is discussed in literature which illustrates the complete line of Hild Maintenance Equipment. Featured are vacuum cleaners and floor machines, which are UL listed for use in Class 1, Group D, and Class 2, Group G, hazardous locations. Hild Floor Machine Co., Inc., 1217 Washington Blvd., Chicago 7, Ill.

For more details circle No. 427 on enclosed return postal card.

Vanish Winter Hazards

Ice-Foe melts snow and ice, a pair of trouble makers that will be with us soon. Walton-March, the manufacturer, describes application and effects in a new bulletin. Walton-March, Highland Park, Ill.

For more details circle No. 428 on enclosed return postal card.

Safety Awards

Benefits of a safety award program are spelled out in a new brochure offered by Metal Arts Co., 742 Portland Ave., Rochester 21, N. Y. Greater safety-consciousness, a dividend of the award program, pays off in lower insurance rates, fewer repair bills, and smaller chance of compensation payments.

For more details circle No. 429 on enclosed return postal card.

Solvent

Chlorothene is the title of a booklet describing a solvent which can be safely used on myriad industrial cleaning jobs, notable among them, electric equipment cleaning. The solvent lowers fire and toxic hazards and combines powerful solvent action with safety in spray, bucket, dip and wipe cleaning. Dow Chemical Co., Dept. SO, 1150 B-1, Midland, Mich.

For more details circle No. 430 on enclosed return postal card.

Skin Cleansers

Sixteen commonly asked questions about skin cleansers are answered in this handy-informative, pocket-size booklet. The "why" behind the importance of lather and the use of the proper scrubber are provided the reader along with definitions of detergent salts; wetting agents; saponification; and titre. Lightfoot Co., Inc., 380 Madison Ave., New York 17, N. Y.

For more details circle No. 431 on enclosed return postal card.

Portable Food Service Equipment

Vacum-insulated food and beverage carrier-dispensers produced by Vacuum Can Co., 19 S. Hoyne Ave., Chicago 12, Ill., are described and illustrated in the firm's literature. This equipment meets the sanitary construction requirements of U. S. Public Health Service Codes. Featured is the new stainless steel deluxe Model No. 5 sterilizer.

For more details circle No. 432 on enclosed return postal card.

Slip-On Fittings

Your maintenance men can build sturdy safety railings with Nu-Rail slip-on fittings and new or used pipe in standard IPS pipe sizes. Stair rails, machine guards, scaffolding and portable guards can also be easily constructed through the use of these fittings. No tools beyond a hex key and a hack-saw are required, because the fittings slip on the pipe, and the unique offset design reduces cutting to a minimum. Complete details on the product and its many applications are included in this brochure. Hollaender Mfg. Co., 3841 Spring Gove Ave., Cincinnati 23, Ohio.

For more details circle No. 433 on enclosed return postal card.

Color Dynamics

A safety color code is spelled out in an attractive new booklet; code benefits are reviewed. The role of "color dynamics" in reducing accident frequency in a steel plant is described. Color and good housekeeping are discussed. Pittsburgh Plate Glass Co., Paint Div., Pittsburgh 22, Pa.

For more details circle No. 434 on enclosed return postal card.

Safety Equipment

Just off the press is your free copy of the big new CESCO 48-page catalog. More than a catalog, this publication is a helpful guide for choosing the right safety protective equipment to meet your particular requirements. For example, there's a detailed chart listing the recommended safety equipment to use for 17 basic classifications of industrial hazards. And there's a complete description and illustration of all the items in the CESCO line. Chicago Eye Shield Co., 205 W. Roscoe St., Chicago 18, Ill.

For more details circle No. 435 on enclosed return postal card.

Fire Training

Walter Kidde & Co., Inc., 675 Main St., Belleville, N. J., has published a 42-page illustrated manual titled, "Training Your Fire Brigade to Use First Aid Extinguishers." Subjects covered include: Organizing a brigade; training; and care and maintenance of fire extinguishers.

For more details circle No. 436 on enclosed return postal card.

Protective Clothing

B. F. Goodrich Industrial Products Co., Akron, Ohio, has published a new 8-page catalog on its line of protective clothing which illustrates and describes worksuits, raincoats, storm suits, and protective coats for firemen and policemen. A special section devoted to glove selection features a chart which compares the characteristics of rubber, neoprene and koroseal gloves in typical service.

For more details circle No. 437 on enclosed return postal card.

Fire Ladders

Duo-Safety Ladder Corp., 513 W. 9th Ave., Oshkosh, Wis., has published a new fire ladder catalog which gives complete specifications on the company's entire line. The 24-page, colorful, well-illustrated booklet also contains factual information on ladder maintenance safety and testing.

For more details circle No. 438 on enclosed return postal card.

Hydrant Valves

Bulletin F-58, 6-page, two-color broadside, describes company's hydrant valves and their applications to fire department pumping operations and gives full engineering details. Keystone Valve Corp., 5325 Kirby Drive, Houston 5, Texas.

For more details circle No. 439 on enclosed return postal card.

Battery Racks

Illustrated 12-page catalog (Form 4883, revised) cites simplified maintenance and maximum deliverable voltage as advantages of mounting stationary-type storage batteries on racks. The Electric Storage Battery Co., Philadelphia 2, Pa.

For more details circle No. 440 on enclosed return postal card.

Circle Item No. 112—Reader Service Card

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Water repellent duck with snap button cover.

NO. 705 TOOL BAG
Separating zipper and inner pocket for small tools.

NO. 21W BOLT & NUT BAG
Reinforced edges and corner supports.

MILLER, the manufacturer of the world's largest line of safety belts, is first in safety equipment development. Better designed canvas bags for every purpose is just one of the results of the MILLER policy "to help Safety Progress," Write Dept. 157 for new catalog showing complete MILLER line and prices.

Miller EQUIPMENT CO., INC.
FRANKLIN PENNA

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SAFETY SUPPLY CO., TORONTO

MANUFACTURER'S REPRESENTATIVE

Calling Direct On Safety Engineers

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To Sell a Complete Line of STEEL-TOE SAFETY SHOES & BOOTS

Manufacturer of one of America's finest safety toe shoes and boots has choice territories available throughout U. S. and Canada. Company under new management offers fine opportunity for aggressive reps with established contacts selling direct to industrial accounts.

Write; give territory, résumé, reference, and name of lines now carried.

Address Replies to:

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Neosho, Missouri

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BOSTON 18, MASS.

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HEAD SNUGGER

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ESSENTIAL for outdoor workmen

Kennedy Head Snuggers, as liners under safety hard hats, provide the necessary protection against cold, wintry blasts. Made of strong sanforized materials, completely washable. Hold their shape and color. An outstanding buy in winter liners.

TOPS IN WARMTH, COMFORT and SAFETY!

The Original and Only "Head Snugger"

Write for catalogue and prices

Manufacturers and distributors of a complete line of safety clothing and equipment.

Write Dept. N-11 for information regarding your needs.

* T. M. Reg. Applied for

KENNEDY-INGALLS, Inc.

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MILWAUKEE 16, WISCONSIN

Circle Item No. 102—Reader Service Card

Index to Advertisers

When writing them, please mention NATIONAL SAFETY NEWS

A
Air Reduction Sales Co. 147
Alan Wood Steel Co. 109
Aluminum Co. of America 102
American Abrasive Metals Co. 145
American Chain & Cable Co., Inc. 107
American LaFrance Corp. 64
American Optical Co. ..... B.C.
American Tel. & Tel. Co. 117
Ampco Metal, Inc. 121
Ansul Chemical Co. 1

B
Bausch & Lomb Optical Co. 103
Bone-Dry Shoe Co. 159
Boyer-Campbell Co. 68
Brossard, Lester L., Co. 139
Bullard, E. D., Co. 17-74

C
Carpenter Mfg. Co. 138
Carroll Pressed Metal, Inc. 144
Chicago Eye Shield Co. ..... I.B.C.
Chicago Hardware Foundry Co. 146
Chicago Watchclock 112
Colorado Fuel & Iron Corp. 123
Coppus Engineering Corp. 51

D
Davenport, A. C., & Son Inc. 141
Dillon, W. C., & Co. Inc. 139
Dockson Corp. 98
Dolge, C. B., Co. 146
Dow Chemical Co. 111
Dow Corning Corp. 66-67
DuPont, E. I., De Nemours & Co. 55

E
Ellwood Safety Appliance Co. 135
Employers Mutual of Wausau 115

F
Finnell Systems, Inc. 148
Foam-X Co. 146

G
General Textile Mills Inc. 145
Gro-Cord Rubber Co. 7

H
Halperin, A. E., Co., Inc. 160
Hansson, Elof, Inc. 132
Haws Drinking Faucet Co. 136
Hollaender Mfg. Co. 132
Holt Mfg. Co. 137
Hood Rubber Co. 65
Horizon Industries 110
Hy-Test Safety Shoe Div., International Shoe Co. 71
Huntington Laboratories Inc. 142

I
Industrial Products Co. 138
Iron Age Div., H. Childs & Co. 53

J
Jackson Products Div., Air Reduction Co., Inc. 101
Johnson Ladder Shoe Co. 140
Jomac, Inc. 120

K
Kennedy-Ingalls Inc. 160
Kidde, Walter & Co., Inc. 100-119

L
Legge, Walter G., Co., Inc. 60
Lehigh Safety Shoe Co. 3

M
Macwhyte Co. 161
Magnesium Company of America 96
Masury-Young Co. 104
McAn, Thom, Safety Shoe Div. 13
McDonald, B. F., Co. 143
Merrill Brothers 98
Meyer Machine Inc. 126
Micro Switch Div., Mpls. Honeywell Regulator Co. 14-15
Miller Equipment Co., Inc. 159
Mine Safety Appliance Co. ..... I.F.C.
Minnesota Mining & Mfg. Co. 106-122
Modern Machine Tool Co. 133
Morrison Products Inc. 136

N
National Disinfectant Co. 108
National Safety Council 127-128-129-130

O
Onox, Inc. 142
Osborn Mfg. Co. 156
Owens-Illinois 147

P
Packwood, G. H., Mfg. Co. 99
Patent Scaffolding Co., Inc. 124-125
Pioneer Rubber Co. 116
Pittsburgh Plate Glass Co. 9
Portable Light Co., Inc. 156
Prairie State Products Co. 135

R
Ready Made Sign Co., Inc. 56
Riggs Nucleonics Corp. 118
Rockwood Sprinkler Co. 95
Rose Mfg. Co. 134

S
Safety Box Toe Co. 69
Safety First Supply Co. 141
Safety Tower Ladder Co. 147
Scott Aviation Corp. 62
Silicone Paper Co. of America, Inc. 11
Silver, Fred, Co. 160
Singer Glove Co. 147
Sperry Gyroscope Co., Div. of the Sperry Rand Corp. 5
Standard Safety Equipment Co. 137
Stephenson Corp. 133
Stonehouse Signs, Inc. 63
Surgical Mechanical Research, Inc. 134

T
Taylor, S. G., Chain Co. 143
Taylor, Halsey W., Co. 140
Tokheim Corp. 126
Trippe Mfg. Co. 146

U
Union Wire Rope Corp. 113
U. S. Borax & Chemical Corp., Pacific Coast Co., Div. 73
U. S. Steel Corp. 59
U. S. Treasury 10

V
Vacuum Can Co. 144

W
Wagner Sign Service, Inc. 70
Walton-March 131
Washington Products Co. 114
Watchmoket Optical Co. 131
Welsh Mfg. Co. 72
Wickwire Spencer Steel Div., Colorado Fuel & Iron Corp. 123
Wiesman Mfg. Co. 156
Wilder Mfg. Co., Inc. 156
Willson Products Div., Ray-O-Vac Co. 97
Wilson Rubber Co. 18
Wyandotte Chemical Corp. 105

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(Furnished only on the 26" diameter mirror)

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- **Enables Optional Installation on counters, posts, walls, ceilings, etc.**
- **Adjustable to height and position**
- **Easily installed in minutes**

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- New Safety Equipment
- Trade Literature

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Advertised Products

—feature equipment and services that will help you solve accident problems in your plant. Instead of making a "mental note," make sure you get full information by sending in the card. If no item number appears with an ad, it will be found on the opposite page, next to the arrow. Cover position ads are shown on the cards as: IFC—inside front cover; IBC—inside back cover; BC—back cover.

•

New Safety Equipment

—shown in the special section has been carefully reviewed. Only new products or newsworthy improvements in existing equipment are considered eligible for this section.

•

Trade Publications

—are catalogs, brochures, spec sheets and booklets—a wealth of helpful literature—describing equipment and services that will assist you in comparing before you buy. You can build a valuable safety equipment reference file with these free publications.

•

IMPORTANT—Be sure to fill in your name, organization and address in the space provided on this side of the postcard.

National Safety News, November, 1958

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(Good until January 31, 1959)

PRODUCTS ADVERTISED:

IFC	IBC	BC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122
123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147
148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172
173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197
198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222
223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247
248	249	250																						

NEW SAFETY EQUIPMENT:

301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350

TRADE PUBLICATIONS:

400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424
425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449
450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474
475																								

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IFC	IBC	BC	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
98	99	100	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120	121	122
123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144	145	146	147
148	149	150	151	152	153	154	155	156	157	158	159	160	161	162	163	164	165	166	167	168	169	170	171	172
173	174	175	176	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197
198	199	200	201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220	221	222
223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240	241	242	243	244	245	246	247
248	249	250																						

NEW SAFETY EQUIPMENT:

301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320	321	322	323	324	325
326	327	328	329	330	331	332	333	334	335	336	337	338	339	340	341	342	343	344	345	346	347	348	349	350

TRADE PUBLICATIONS:

400	401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420	421	422	423	424
425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440	441	442	443	444	445	446	447	448	449
450	451	452	453	454	455	456	457	458	459	460	461	462	463	464	465	466	467	468	469	470	471	472	473	474
475																								

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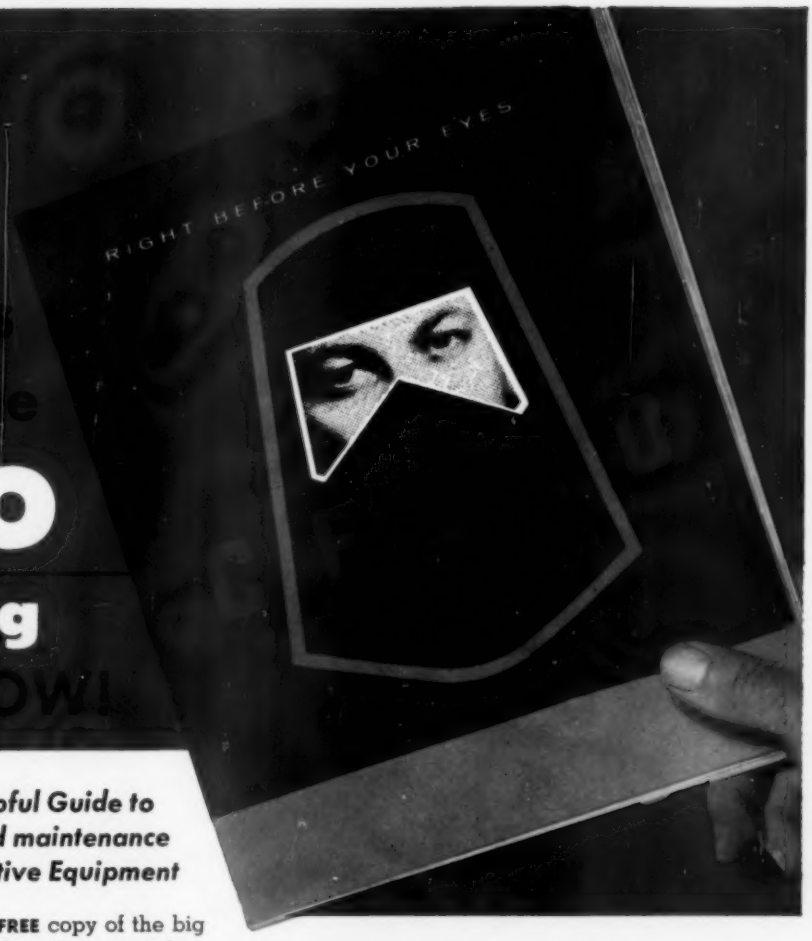

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314 South 45th Street

PITTSBURGH, PA.
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CESCO

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The overall rugged construction prevents vibration of protector while in use. Results in superior performance. THESE ARE THE REASONS WHY MOST AIRCRAFT MANUFACTURERS USE THE AO STRAIGHTAWAY — why this muff is the most widely accepted. Write for literature containing attenuation charts or call your nearest American Optical Safety Products Representative.

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American Optical COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS
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